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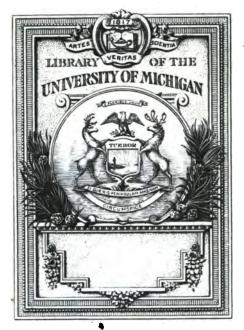
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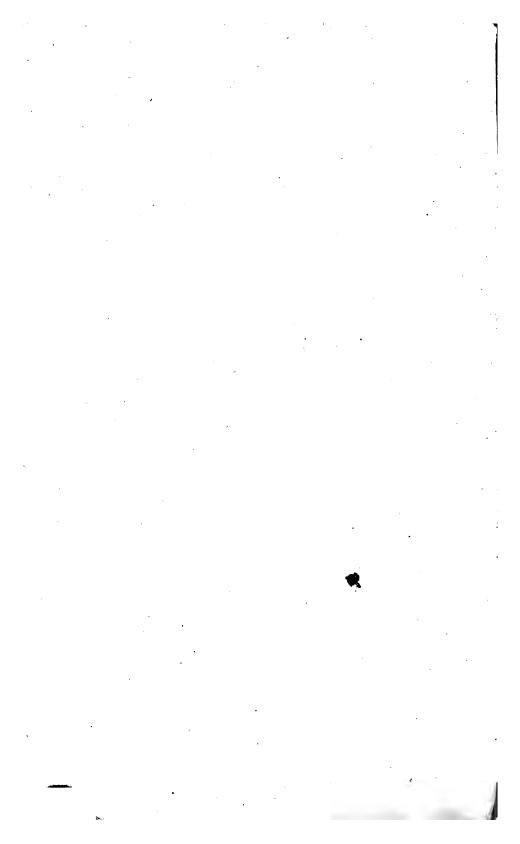
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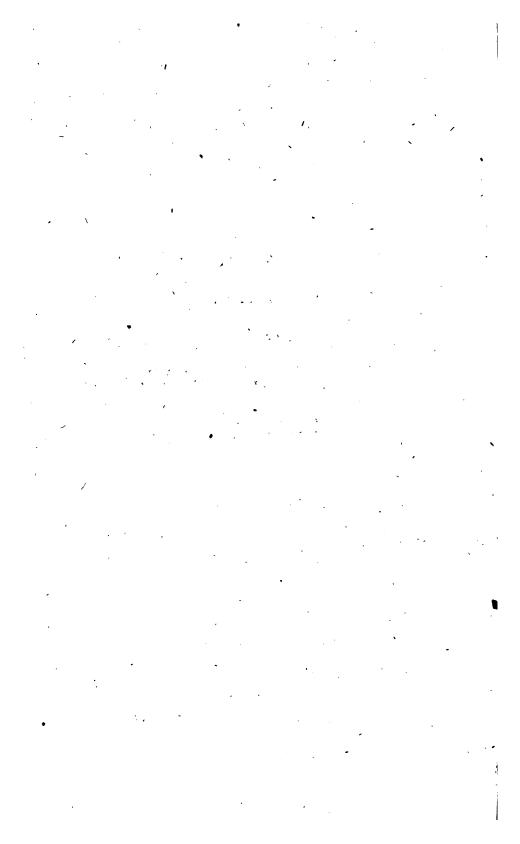


# COLLECTION

O F

# MATHEMATICAL

TABLES.



OF

## MATHEMATICAL TABLES,

FOR

## THE USE OF STUDENTS

IN

UNIVERSITIES AND ACADEMIES,

FOR THE PRACTICAL

NAVIGATOR, GEOGRAPHER, AND SURVEYOR,

FOR

MEN OF BUSINESS.

**ಟ**್ಟ

BY

# `ANDREW MACKAY,

LL.D. F. R. S. EDINB. &c.

## London:

PRINTED FOR LONGMAN, MURST, REES AND ORME, PATERNOSETE-ROW;

W. J. AND J. RICHARDSON, ROYAL EXCHANGE; BLACKS AND

PARRY, LEADENHALL-STREET;

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THIS

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IS,

WITH THE HIGHEST DEFERENCE AND RESPECT,

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MAJOR-GENERAL OF HIS MAJESTY'S FORCES IN NORTH BRITAIN, COLONEL OF THE NINETY-SECOND REGIMENT, &c.

ΒŸ

HIS LORDSHIP'S

MOST OBEDIENT,

AND MOST HUMBLE SERVANT,

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that grainage expit.
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## PREFACE.

The great use of Tables, for the purpose of facilitating calculations in all the various branches of Mathematics, is so apparently obvious, as to require no comment. There has not, however, been any extensive collection of tables hitherto published; and those in common use being scattered through various works, much time is lost, and a considerable portion of unnecessary expence incurred. In order, therefore, to remove these difficulties, the following Collection has been made; which, it is hoped, will be found useful to students in Universities and Academies; to the practical Navigator, Geographer and Surveyor, and to many others in different departments in life.

Very great attention has been paid to the correction of the press, so that it is presumed few errors have escaped notice; and, as an Explanation of the Tables is prefixed, it is, therefore, hoped, that no difficulty will occur in the manner of using them.

It was the intention of the Author to have added several more scarce and valuable tables, but, by so doing, the work would have been swelled far beyond its intended limits; these additional tables, however, may, probably, appear in a distinct volume, to which this is to be considered as the first.

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### ERRATA.

Page 1. Aisla, for Lat. 55° 15′, and Long. 5° 5′, read 55 56. 6 9.

Page 11. Rothesay, for time of high water 11 hours, read 12 hours.

The Binder will observe, that Sig. [D] of the Tables has been omitted—Sig. [E] must therefore immediately follow Sig. [C], being a continuation of Table VIII.

## EXPLANATION OF THE TABLES.

## TABLE I.

## The Latitudes and Longitudes of Places.

THIS table is divided into seven columns; the first column contains the names of the places, ranged in alphabetical order; the second, the continent in which the place is situated, or to which it belongs; the third, the country, province, or island; the fourth, the sea or coast; the fifth and sixth columns contain the latitude and longitude respectively, expressed in degrees and minutes, (the longitude being reckoned from the meridian of Greenwich); and the seventh column contains the time of high water at new and full moon, at those places where there are tides, and where the time is known.

This table is compiled from the requisite Tables, the Philosophical Transactions, the Connaissance des Temps, Exposition du Calcul, and other treatises which, it was presumed, could be depended on. A few of the places also are from the communications of correspondents,\* and from the observations of the author. And he has been careful neither to insert any of those places, whose positions, to him, seemed doubtful; nor places within land, as being unnecessary to the practical seaman, and serving only to increase the bulk of the table, without being of any real utility. Hence, although this table is not so extensive as some others, yet he flatters himself it is as correct as any of the same kind hitherto published, having bestowed great pains for this purpose.

## TABLE II.

## To find the Moon's Age.

By this table, the moon's age is found by inspection only, from the year 1800 until 1894, inclusive; and the method of extending it a few years before or after the limits of the table is obvious.

This table is divided into two parts; the first of which contains the months and days, and the other the years, with the moon's age. In this last part, N stands for new moon, and F for full moon. In order, therefore, to find the moon's age on any given day of any given year, within the limits of the table, find the pro-

The positions of many of those places on the west coast of Scotland, were communicated by Mr. Lamont, of Greenock,

posed day under the given month, then, on the same horizontal line, and under the given year, is the moon's age required. Thus, upon the 17th of October 1880, the moon's age is thirteen days. March 12th, 1869, it is new moon, and on the 18th of the same month, in the year 1878, it is full moon.

The epact for any given year within the limits of the table, is found at the bottom of the column immediately under the given

year. Thus; the epact for the year 1850 is 17.

## TABLES III. AND IV.

## Epacts of Years and Months.

By these tables, the mean age of the moon, at any given time, may be found to the nearest ininute, by adding the epacts of the given year and month, and the proposed time reduced to the meridian of Greenwich. If this sum exceeds a mean lunation, or 29 d. 12 h. 44', deduct it therefrom. The mean time of new moon is found by subtracting the sum of the epacts of the given year and month, from 29 d. 12 h. 44'; but if greater than that quantity, subtract it from 59 d. 1 h. 29', to which add the longitude, in time, if east, but subtract it if west. The mean time of the preceding, or following full moon, is found by subtracting, or adding 14 d. 18 h. 22'; and the quarters, by applying 7 d. 9 h. 11'.

## TABLE V.

Correction to be added to the Time of High Water at any given Place at New and Full Moon, to find the Time of High Water on any other Day of the Moon.

Column t of this table contains the moon's age to every six hours; and the second column contains the corresponding time, to be added to that of high water at full and change, to find the time of high water on the proposed day.

## TABLE VI.

Commission of the second

Equation of the Time of High Water, depending on the angular Distance between the Sun and Moon, and on the Distance of the Moon from the Earth.

In order to ascertain the time of high water at a given place, with any tolerable degree of accuracy, corrections, depending on the angular distance between the sun and moon, and on the distance of the moon from the earth, must be used. The distance, also, of the sun from the earth ought to be taken into account that this last being much less than either of the former is here neglected. In this table, therefore, the combined correction arising from the position of the moon, with respect to the sun in right ascension, and to the earth, is contained. The angular distance in

right ascension, in time, is expressed by the moon's transit; and the distance of the moon from the earth is in the inverse ratio of its horizontal parallax, and both these being readily found by the Nautical Almanac, they are, therefore, adopted as the arguments of the table.

The time of high water at any proposed place, is found by applying the equation from the table answering to the time of transit and horizontal parallax, reduced to the meridian of the given place, according to its title, to the sum of the time of high water at full and change, and the time of transit reduced to the meridian of the given place by Table XXX. This will be the approximate time of high water; and if greater accuracy be required, the time of transit and horizontal parallax are to be again reduced to this time; and the equation answering to these, is to be taken from the table, and applied as before.

## TABLE VII.

The Miles and Parts of a Mile contained in a Degree of Longitude, at each Degree of Latitude.

The first column of this table contains degrees of latitude, and the second column contains the miles and hundredth parts of a mile in a degree of longitude, corresponding thereto: the other columns are a continuation of the first and second. If the given latitude consists of degrees and minutes, a proportional part of the difference between the miles and parts of a mile, answering to the given and following degrees of latitude, is to be found, and subtracted from the miles, &c. answering to the given degree of latitude.

#### EXAMPLE.

Required the number of miles contained in a degree of longiude, in latitude 48° 50?

Miles in a degree of longitude, in latitude 48° = 40.15 in latitude 49° = 39.36

Difference - 79

Then, As 60': 50'::.79:.66 nearly; which, subtracted from 40.15, gives 39.49; the measure of a degree of longitude, in latitude 48° 50'.

The proportional part may be very readily found by the traverse table, as follows. Find that page in the table, in which the given minutes of excess above the next less degree of latitude, in a latitude column, answers to 60 in a distance column; then, opposite to the difference of the numbers in a distance column, is the proportional part in a latitude column. Thus, in the preceding example, 50' in a latitude column, will correspond with 60' in a distance column nearly, under 33°; then, opposite to 79 in a distance column is 66 in a latitude column, the proportional part as before.

This table may be applied to calculations in Parallel and Middle Latitude Sailing. It is a table of natural co-sines, adapted to a ra-

dius of 60.

## TABLE VIII.

## The Logarithms of Numbers.

Logarithms are a set of quantities expressing the measures of the ratios of the terms of another set of quantities or numbers. Or, Logarithms are the indices or exponents of a series of numbers in geometrical progression.\*

Let the following be a series of numbers in geometrical progression, namely, 1. r. r. r. r. r. r. r. r. r. e. &c. And the indices, or o. d. 2d. 3d. 4d. 5d. 6d. &c. will be the logarithms of the corresponding terms, each of each.

By a comparison of the several terms of these serieses, it is evident that 2d + 4d, or 6d, answers to, or is the logarithm of

$$r^{2d} \times r^{4d}$$
, or  $r^{6d}$ . And  $6d - 2d$ , or  $4d$  answers to  $\frac{r^{6d}}{2d}$ , or  $r^{4d}$ 

Also, 
$$\frac{2d+4d}{2}$$
, or 3d, answers to  $\sqrt{r^{2d} \times r^{4d}} = \sqrt{r^{6d}} = r^{3d}$ , &c. And hence, all the various rules for performing Multiplication,

Division, Proportion, Involution, Evolution, &c. by logarithms, are obvious.

Since r and d may be expounded by any numbers whatever, it is, hence, evident, there may be an infinite variety of different kinds of logarithms. Let 10 be substituted for r, and 1 for d, and the serieses become

These are the logarithms in common use, and are called *common logarithms*, in order to distinguish them from other kinds of logarithms.

Hence, in this form of logarithms, the logarithm of 1 is 0, the log. of 10 is 1, the log. of 100 is 2, the log of 1000 is 3, &c. Whence, the logarithm of any term between 1 and 10, being greater than 0, but less than 1, is a proper fraction, and is expressed decimally. The logarithm of each term between 10 and 100 is 1, with a decimal fraction annexed; the logarithm of each term between 100 and 1000 is 2, with a decimal fraction annexed, and so on. The integral part of the logarithm is called the *Index*, or characteristic, and the other the decimal part. The index is, evidently, always one less than the number of figures in the natural number, exclusive of fractions, if there are any in that number.

<sup>\*</sup> Or, Logarithms are a series of numbers so contrived, that the sum of the logarithms of any two numbers, is the logarithm of the product of these numbers. Hence it is inferred that, if a rank, or series of numbers in arithmetical progression, be adapted to a series of numbers in geometrical progression, any term in the arithmetical progression, will be the logarithm of the corresponding term in the geometrical progression.

The index of the logarithm of a number, consisting in whole, or in part of integers, is affirmative; but if the number be a proper fraction, the index is negative, and is usually marked by the sign (—) placed either before or above the index. If the first effective figure of the decimal fraction be adjacent to the decimal point, the index is — 1, or 1: if there is one cypher between them, the index is — 2, or 2: if two cyphers, the index is — 3, or 3. Instead of negative indices, their arithmetical complements are used by many; as by this means the computations are rendered easier, especially to those unacquainted with the first principles of Algebra.

The decimal parts of the logarithms of numbers, consisting of the same figures, are the same, whether the number be integral,

fractional, or mixed. This is illustrated as follows:—

| Number | 189600 | Logarithm |   |   | - | -   | 5.27784   |    |         |
|--------|--------|-----------|---|---|---|-----|-----------|----|---------|
|        | 18960  | - "       | _ | - | - | -   | 4.27784   |    |         |
|        | 1896   | -         | - | - | - | -   | 3.27784   |    |         |
|        | 189.6  | -         | - | - | - |     | 2,27784   |    |         |
|        | 18.96  | -         | - | - | • | -   | 1.27784   |    |         |
|        | 1.89   | 6         | - | - | - | • . | 0.27784   |    |         |
|        | .18    | 96        | - | - | - | _   | - 1.27784 | or | 9.27784 |
|        | .01    | 896       | - | - | - | -   | - 2.27784 | -  | 8.27784 |
|        | .00    | 1896      | - | - | - | . – | - 3,27784 | -  | 7.27784 |
|        | .00    | 01896     |   | - | - | _   | - 4.27784 | -  | 6.27784 |
|        | .00    | 00189     | 6 | - | - | -   | - 5.27784 | -  | 5.27784 |

Table VIII. contains the logarithms of all numbers under 10000, extended to five decimal places, which is sufficiently accurate, in most cases, in navigation or practical mathematics. As the index is not prefixed, it must therefore be supplied, which is easily done, being always one less than the number of figures in the natural number.

## PROBLEM I.

To find the logarithm of any given number.

## RULE.

If the number is under 100, its logarithm is found in the first page of the table, immediately opposite thereto.

If the number consists of three figures, find it in the first column of the following part of the table, opposite to which, and under o,

is its logarithm.

If the given number contains four figures, the three first are to be found, as before, in the side column, and under the fourth at the top of the table is the logarithm required; to which, the index

3 is to be prefixed, if the given number is an integer.

If the given number exceeds four figures, find the difference between the logarithms answering to the first four figures of the given number, and the next following logarithm; multiply this difference by the remaining figures in the given number, point off as many figures to the right-hand as there are in the multiplier, and the remainder, added to the logarithm, answering to the first four figures, will be the required logarithm, nearly.

The logarithm of a vulgar-fraction is found by subtracting the logarithm of the denominator from that of the numerator; and that of a mixed quantity is found by reducing it to an improper fraction, and proceeding as before.

## EXAMPLES.

Ŧ.

What is the logarithm of 59?

In the first page of the table, opposite to 59 is 1.77085, the logarithm required.

·II.

Required the logarithm of 365?
Opposite to 365, and under 0, is 2.56229.

III.

Sought the logarithm of 7854?
Opposite to 785, and under 4, is 3.89509.

IV.

Required the logarithm of 186479?

| The logarithm of 1864                  | _           | -  | is | -   | -      | 27045                   |
|--|-------------|----|----|-----|--------|-------------------------|
| 1865                                   | • -         | -  | is | -   | -      | 27068                   |
| Difference                             | ÷           | •  | •  | -   | •      | 23<br>79                |
|  |             |    |    |     | •      | 20 <b>7</b><br>161      |
| Proportional part -<br>Logarithm of 18 | 86 <b>4</b> | .` | •  | •   | 2      | 18.17<br>7 <b>045</b> . |
| Logarithm of 1                         | 86479       |    | -  | - ' | - 5.27 | 063                     |

Ý.

Required the logarithm of  $\frac{9}{11}$ ?

| •                           | × . |   | ••                     |
|-----------------------------|-----|---|------------------------|
| Logarithm of 9              | -   |   | 0.95424                |
| of 11                       | •   | - | 1.04189 .              |
| Logarithm of $\frac{9}{11}$ |     |   | 9.91285, or — 1.91285. |

VI.

What is the logarithm of 75?

| 4   |       | 61      | - | log. | • | - | - | - | 1.78533 |
|-----|-------|---------|---|------|---|---|---|---|---------|
| 71  | =     | 8       | • | log. | _ | - | - | - | 0.90309 |
| Log | garit | na of 7 |   |      | - | - | - | - | 0.88224 |

## PROBLEM II.

To find the number answering to any given logarithm.

#### RULE.

Find the next less logarithm to that given in the column marked o at the top, and continue the sight along that horizontal line, and a logarithm the same as that given, or very near it, will be found; then the three first figures of the corresponding natural

number will be found opposite thereto in the side column, and the fourth figure immediately above it, at the top of the page. If the index of the given logarithm is 3, the four figures thus found are integers: if the index is 2, the three first figures are integers, and the fourth is a decimal, and so on.

If the given logarithm cannot be exactly found in the table, and if more than four figures be wanted in the corresponding natural number; then find the difference between the given and the next less logarithms, to which annex as many cyphers as there are figures required above four in the natural number; which divide by the difference between the next less, and next greater logarithms, and the quotient annexed to the four figures formerly found, will give the required natural number.

## EXAMPLES.

T

Required the natural number corresponding to the logarithm 2.79477?

This logarithm is found opposite to 623, and under 4; hence, since the index is 2, the corresponding number is 623.4.

IT.

What is the number answering to the logarithm 5.13278? The next less logarithm in the tables is .13258, answering to 1357; the difference between which and the given logarithm is 20, to which two cyphers being annexed, gives 2000: now, this divided by 32, the difference between the next less and next greater logarithms, the quotient is 62, which annexed to 1357, gives 135762, the number required.

#### PROBLEM III.

To perform MULTIPLICATION by Logarithms.

## RULE.

Add the logarithms of the factors, and the sum is the logarithm

of the product.

If there are negative and affirmative indices, their difference is to be taken; or rather use the arithmetical complements \* of the negative indices, and reject tens from the sum of these indices.

#### EXAMPLES.

|         |             | Mult | iply 2 | I.<br>256 | bv : | 12 ? |   |                    |
|---------|-------------|------|--------|-----------|------|------|---|--------------------|
| Factors | { 256<br>13 | -    | log.   | -         | -,   | -    |   | 2.40824<br>1.11394 |
| Product | 3328        | -    |        | _         |      |      | _ | 3.59218            |

<sup>\*</sup> The arithmetical complement of the logarithm of any number, is found by subtracting the given logarithm from that of the radius, or by subtracting each of its figures from 9, except the last, or right-hand figure, which is to be taken from 10. The arithmetical complement of an index is found by subtracting it from 10.

#### EXPLANATION OF THE TABLES.

#### II.

|                 |     |                       |        | 11.  |                   |                 |
|-----------------|-----|-----------------------|--------|------|-------------------|-----------------|
|                 | Mι  | iltiply 17            | 7.8 by | 0.4, | and by 0.0065?    | •               |
|                 | C   | 17.8                  |        |      | - 1.25042, or     | 1.25042         |
| <b>F</b> actors | ₹   | 0.4<br>0.00 <i>65</i> | -      | - "  | - 1.60206 -       | 9,60206         |
|                 | (   | 0.0065                | •      | -    | <b></b> 3.81291 - | 7.81291         |
|                 |     |                       |        |      |                   |                 |
| Product         | • • | 0.04628               | -      | -    | 2.66539 <b>-</b>  | 8.665 <b>39</b> |

## PROBLEM IV.

To perform DIVISION by Logarithms.

## RULE.

From the logarithm of the dividend, subtract the logarithm of the divisor, the remainder is the logarithm of the quotient.

If one or both of the terms are less than unity, remove the decimal points till the factors contain whole numbers, and the dividend the greatest; then, if the dividend be more places removed than the divisor, remove the decimal point of the quotient as many places to the left hand; but if the divisor be more places removed, then remove the decimal point of the quotient as many places to the right hand. If the dividend and divisor be equally removed, the quotient is not to be altered.

### EXAMPLES.

| 1 | r |   |
|---|---|---|
|   |   | _ |
|   |   |   |

|            |        |         | i i  | Ł,    |     |              |   | •       |
|------------|--------|---------|------|-------|-----|--------------|---|---------|
|            |        | Divide  | 17   | 98 by | 36  | ?            |   | •       |
| Dividend   | •      | 1798    | · '  | log.  | -   | •            | - | 8.25479 |
| Divisor    |        | . 36    | •    | log.  | -   | -            | - | 1.55630 |
| Quotient   |        | 49.94   | -    |       | +   | <del>-</del> |   | 1.69849 |
|            |        | ,       | I    | I.    |     |              |   | ,       |
| •          |        | Divide  | 8.2  | 42 by | .96 | ?            |   |         |
| Dividend - | 8.42,  | removed | deg. | 84.2  | -   | log.         | - | 1.92531 |
| Divisor -  | .96    | -       | - `  | 9.6   | -   | -            | - | 0.98227 |
| Quotient   | - ·· - | -       | - ,  | 8.771 | -   | -            | - | 0.94304 |

#### PROBLEM V.

To perform PROPORTION by Logarithms.

#### RULE.

From the sum of the logarithms of the second and third terms, subtract the logarithm of the first term, the remainder is the logarithm of the answer.

#### EXAMPLE.

#### T.

If a ship sails 15 knots in 2½ hours, how many miles will she run in 19 hours at the same rate?

| As 2.5    | hours |   | - | log. |   | - | ′ | 0.39794 |
|-----------|-------|---|---|------|---|---|---|---------|
| Is to 19. |       | - | - | -    | - | - | - | 1.27875 |
| So is 15  | miles | - | - | -    | - | - | - | 1.17609 |
| To 114    | miles | _ |   |      |   | _ |   | 205600  |

#### TT.

A merchantman, distant 22 miles, going at the rate of 4½ knots an hour, is pursued by a privateer, whose hourly rate of sailing is 6 knots; after two hours chase the breeze freshened, and the merchantman's rate was encreased to 5.8 knots, and the privateer's to 8.4. In what time will the privateer come up with the merchantman?

As the privateer gained 1½ miles an hour on the merchantman, at the end of the first two hours, the distance between them was 19 miles. During the remaining part of the chase, the hourly advance of the privateer was 2.6 knots. Therefore,

| As the    | hourly rate   | - | 2.6      | - | 0.41497     |
|-----------|---------------|---|----------|---|-------------|
| Is to the | distance      | - | 19.      | - | 1.27875     |
| So is     |               | - | · 1 hour | - | 0.00000     |
|           | ,             |   |          |   | <del></del> |
| To the    | time required |   | 7 908    | - | 0.86978     |

Hence, from the time the breeze freshened, the privateer would come up with the merchantman in 7 h. 18', or 9 h. 18' from the commencement of the chase.

## PROBLEM VI.

To perform INPOLUTION by Logarithms, that is, to find the square, cube, &c. of any given number.

## RULE.

Multiply the logarithm of the given number by the index of the power, and the product is the logarithm of the power sought.

#### EXAMPLES.

| What | is | the | square | of | ٢8 | ? |
|------|----|-----|--------|----|----|---|

| Given nur    |        | 58   | - | lo | g. | - | • | 1.7 | 6343 |
|--------------|--------|------|---|----|----|---|---|-----|------|
| Index of the | he por | wer  | • | -  | -  | - | - | -   | 2    |
| Square       |        | 3364 |   | -  | -  | - | - | 3.5 | 2686 |

#### 11.

## 2. What is the fourth power of 16?

| Given number     | 16    | - | log. | - | - | 1.204 | 12            |
|------------------|-------|---|------|---|---|-------|---------------|
| Index of the pow | rer - | - | •    | - | - | •     | 4             |
| Fourth power     | 65536 | - | •    | - | - | 4.816 | <del>18</del> |

## PROBLEM VII.

To perform EVOLUTION by Logarithms, that is, to extract any proposed root of any given number.

#### RULE.

Divide the logarithm of the given number by the index of the root, the quotient is the logarithm of the root.

If the given number is a decimal, and the arithmetical comple-

ment of the negative index used, prefix 1 to that index for the square root, 2 for the cube-root, &c.

## EXAMPLES.

| ٠, | r |  |
|----|---|--|
|    |   |  |
|    | L |  |

## Required the square-root of 8464?

| Given number | - | 8464 | - | - | - | 3.92758 |
|--------------|---|------|---|---|---|---------|
| Square-root  | - | 92   | - | - | - | 1.96379 |
|              |   |      |   |   |   |         |

#### Ц.

## Required the cube-root of 6896?

| Given number | - | 6896   | - | - | - | 3.83860                   |
|--------------|---|--------|---|---|---|---------------------------|
| Cube-root    | - | 19.033 | - | - | - | .1 <b>.</b> 2795 <b>3</b> |

### PROBLEM VII.

To find the TONNAGE of a Ship by Logarithms, according to the common Method.

#### RULE.

If the vessel is a ship of war, let fall a perpendicular from the fore-side of the stem, at the height of the hause holes; but if a merchantman, the perpendicular is to be let fall from that part of the fore-side of the stem which is at the same height above the keel, as the wing transom: also let fall another perpendicular from the back of the main post, at the height of the wing transom. Find the distance between these two perpendiculars, from which subtract three-fifths of the extreme breadth; and also, the product of the height of the wing transom above the upper edge of the keel, by 2½ inches, and the remainder is the length of the keel for tonnage. To the logarithm of which, add the logarithm of the breadth, and that of the half-breadth, and the constant logarithm 8.02687,\* the sum, rejecting to from the index, will be the logarithm of the tonnage required.

## EXAMPLE.

Let the length between the perpendiculars at the fore-part of the stem, and the back of the post, be 100 feet; the extreme breadth 27½ feet, and the height of the wing transom 15 feet. Required the tonnage?

100 feet

Length between the perpendiculars

| Three-fifths extreme brea<br>Height, wing transom |    | $2\frac{1}{2}$ , c | or =     | 16.8<br><b>3.</b> 1 | 5<br>1 <b>25</b> |      |         |
|---|----|--------------------|----------|---------------------|------------------|------|---------|
| Sum   | -  | -                  | -        | -                   | 19.625           |      | •       |
| Length of keel for touna                          | ge | _                  | <b>.</b> | - '                 | 80.375           | log. | 1.90512 |
| Extreme breadth ' -                               | ٠. | -                  | -        | -                   | 27.5             |      | 1.43933 |
| Half extreme breadth                              | _  | -                  | -        | -                   | 13.75            |      | 1.13830 |
| Constant logarithm                                | -  | -                  | -        | -                   |                  |      | 8.02687 |
| Tonnage   | -  | -                  | -        | -                   | 3 <b>21.3</b>    |      | 2.50962 |

<sup>\*</sup> The arithmetical complement of the logarithm of 94, being the common divisor for finding the tonnage.

## TABLE IX.

To reduce Points of the Compass to Degrees, and conversely.

This table is divided into six columns; in the two first and two last columns, the names of the several points and quarter-points of the compass are contained; the third column contains the corresponding number of points and quarter-points reckoned from the meridian; and the fourth column, the degrees, &c. answering thereto. The manner of using this table is obvious.

## TABLE X.

Logarithmic Sines, Tangents, and Secants, to every Point and Quarter of the Compass.

In making calculations by logarithms relative to a ship's place, as deduced from the course and distance, &c. it will be found more convenient, if the course is given in points, to take the sine, &c. of it from this table, than to reduce the course to degrees, and take the sine, &c. of it from the following table.

The points and quarters are contained in the first and last columns, and the log. sines, tangents, and secants, in the intermediate columns.

## TABLE XI.

Logarithmic Sines, Tangents, and Secants, to each Degree and Minute of the Quadrant.

This table contains the logarithms of the natural sines, tangents, and secants.

The degrees are numbered at the top of the table, in a direct order, from 0° to 45°; and at the bottom of the table, in a retrograde manner, from 45° to 90°. The minutes are contained in the marginal columns; those in the left-hand column belonging to the degree at the top, and the minutes in the right-hand column belonging to the degree at the bottom of the page.

#### PROBLEM I.

To find the sine, co-sine, &c. answering to any given degree and minute.

#### RULE.

Find the given degrees at the top of the page, if less than 45°, and the minutes in the left-hand column; opposite to which, and under the word sine, co-sine, &c. is the quantity required. But, if the given degrees be between 45° and 90°, find them at the bottom, and the required sine, co-sine, &c. will be found above the word sine, co-sine, &c. opposite to the given number of minutes in the right-hand column.

If the given arch exceeds 90°, find the sine, co-sine, &c. of its supplement.

## Examples.

I.

Required the log. sine of 23° 28'?

Under the word sine, in the page marked 23° at the top, and opposite to 28' in the left-hand column, is 9.60012, the sine of 23° 28'?

II.

Required the co-tangent of 57° 9'?

In the page marked 57° at the bottom, above the word co-tangent, and opposite to 9' in the right-hand marginal column, is 9.81003, the co-tangent of 57° 9'.

III.

What is the secant of 138° 50'?

The supplement of 138° 50' is 41° 10', the secant of which is 10.12332. Or, which is the same, the co-secant of 48° 50', the excess of the given arch above 90°, is 10.12332, the secant of 138° 50' as required.

## PROBLEM II.

To find the sine, tangent, &c. of an arch expressed in degrees, minutes, and seconds.

## RULE.

Find the sine, tangent, &c. answering to the given degree and minute, and also that answering to the next greater minute; multiply the difference between them by the given number of seconds, and divide the product by 60; then, the quotient added to the sine, tangent, &c. of the given degree and minute, or subtracted from the co-sine, co-tangent, &c. will give the quantity required, nearly.

If the arch be less than three degrees, it will be necessary to use

the following rule:-

To the arithmetical complement of the given degrees and minutes reduced to seconds, add the logarithm of the given degrees, minutes, and seconds, reduced to seconds, and the log.-sine, tangent, &c. of the given degrees and minutes, the sum, rejecting 10 from the index, will be the log.-sine, tangent, &c. of the proposed number of degrees, minutes, and seconds.

EXAMPLES.

T

Required the log.-sine of 15° 2' 28"?

| Log. sine             | £     | 15° 2′        |         |        | 9           | .41 <b>394</b>  |               |
|-----------------------|-------|---------------|---------|--------|-------------|-----------------|---------------|
| •                     |       | 15 9          | •       | -      | 9.          | 41441           |               |
| Difference<br>Seconds | -     |               | •       |        | -           | 47<br>28        |               |
|                       | ,     |               |         |        |             | 376<br>94       |               |
| ,                     |       | · ·           |         |        | <b>6.</b> 0 | ) 131.6<br>21.9 | or 22 nearly. |
| Sine of<br>Proportion | al pa | 15° 2'<br>urt |         | -      | . •         | -               | 9.41394       |
| Sine of               | •     | 150 2/ 28/    | •       |        | -           | -               | 9,41416       |
| •                     |       |               | II.     |        |             |                 | ·             |
|                       | Re    | quired the    |         | t of   | 1° 36       | 5' 23"          | ?             |
| 1° 36'                | =     | 5760          |         | ar. co | . log       | -               | 6.23958       |
| 10 36' 23"            | =     | 5783          | •       | log.   | -           | •               | 3.76215       |
| 1° 36′                | •     | •             | tangent | •      | •           | -               | - 8.44611     |
| 10 36/ 29/            | ٠ ـ   | •             | tangent | -      | -           |                 | 8.44784       |

## PROBLEM III.

To find the degrees and minutes answering to any given log. sine, tangent, &c.

## Rule.

Find in its respective column, the nearest sine, tangent, &c. to that given, and take the degrees from the top or bottom of the page, according as the quantity is found in a column titled at the top or bottom, and the minute is found in the same horizontal line, in the left or right hand marginal columns, according as the quantity is found in a column titled at the top or bottom of the page.

## EXAMPLES.

#### T

Required the degrees and minutes answering to the log. sine 9.49768?

This is found in the column marked sine at the top, under 18 degrees, and opposite to 20 minutes.

#### П.

Required the degrees and minutes answering to the log. tangent 10.35416?

The nearest to this is found in the column titled tangent at the bottom, above 66 degrees, and opposite to 8 minutes.

## PROBLEM IV.

To find the degrees, minutes, and seconds, answering to a given logarithmic sine, tangent, &c.

## RULE.

Find the degrees and minutes answering to the next less logarithmic sine, tangent, &c., which subtract from that given; multiply the remainder by 60, and divide the product by the difference between the next less and next greater logarithms, and the quotient will be the seconds to be annexed to the degrees and minutes before found.

If the given logarithm is that of the sine or tangent of a small arch—then, to the arithmetical complement of the next less logarithm in the tables, add the given logarithm, and the logarithm of the degrees and minutes, in seconds, answering to the next less logarithm, the sum, rejecting radius, will be the logarithm of the number of seconds in the required arch.

## EXAMPLES.

Ī.

Required the arch corresponding to the logarithmic sine 9.25486?

| Given log. | ine   | -   | - | 9.2  | 5486, |   | next ; | greate | er | 9.2 | 55  | 14             |
|------------|-------|-----|---|------|-------|---|--------|--------|----|-----|-----|----------------|
| Next less  | 10° 5 | 217 | - | 9.23 | 5445  | - | - `    | •      |    | 9.2 | 544 | <del>1</del> 5 |
|            |       |     |   |      |       |   |        |        |    |     |     | _              |
| Difference | -     | -   | - | -    | 41    | • | ٠.     | -      | _  | -   | . ( | 59             |

Now, 41 multiplied by 60", and divided by 69, the quotient is 36" nearly; hence the corresponding arch is 10° 21' 36".

#### 11.

## Required the arch answering to the log. tangent 8.31085?

| The   | e next less log, tang | ent in the t | table is | 8.30888, | whic | h answ     | ers |         |
|-------|-----------------------|--------------|----------|----------|------|------------|-----|---------|
| to 1° | 10', the ar. co. of w | hich is      |          |          | -    |            | -   | 1.69112 |
| •     | Given log. tangen     |              |          |          | -    |            | -   | 8.31085 |
|       | Next less arch        | 1° 10′       | =        | 4200"    | -    | log.       | -   | 3.62325 |
| ,     | Required arch         | 1° 10′ 19″   | ==       | 4219     | -    | i <b>-</b> | ٠   | 3:62522 |

#### TABLE XII.

Traverse Table to Points and Quarters of the Compass.

In this table, the points and quarter points under 4 points, are contained at the top of the table; and those between 4 and 8 points, at the bottom. The first column contains the distance to 60 miles, the second column contains the difference of latitude, and the third the departure, if the course is less than 4 points; but if the course exceeds 4 points, the second column contains the departure, and the third the difference of latitude. The other columns are a continuation of the former, the distance being extended to 300 miles.

If the given distance exceeds 300 miles, collect the several differences of latitude and departures answering to the several distances, that make up the given distance. Thus, Let the course be  $3\frac{1}{4}$  points, and the distance 573 miles.

To course 34 points, and dist. 300, the diff. of lat. is 241.0, and dep. 178.7

Hence, to course \$1 points, and dist. 573, the diff. of lat. is 460.3, and dep. 341.3

## TABLE XIII.

## Traverse Table to each Degree of the Quadrant.

This table is similar to the former in every respect, except that it is adapted to each degree of the quadrant, instead of each point and quarter point of the compass. The degrees under 45° are found at the top of the table, and those between 45° and 90°, at the bottom.

This table, besides its use in navigation, will serve as a general table of proportion, by finding the greatest of the two first terms of the proportion in a distance column, and the other in a latitude or departure column; then, opposite to the third, in a column of the same name with that in which the first term was found, will be the fourth term in a column of the same name as that in which the second term was found.

## EXAMPLES.

Ţ

If a ship sails 8 miles in 3 hours, what distance will she run in a day; and in what time will she run 235 miles, the rate of sailing

being supposed uniform?

Eight in a distance column will be found to correspond with 3 in a departure column, under 22°; then, opposite to 24 in a departure column is 64 miles in a distance column; and opposite to 235 miles in a distance column is 88, or 3 d. 16 h. in a departure column.

#### II.

If a seaman receive 4 guineas per month of 30 days, what will

his wages amount to in 3 months 7 days?

In three months, it is evident, the wages will amount to 121. 12s. Now, for the proportional part answering to the 7 days, find 30 in a distance column, and turn over until 7 is found in a departure column. Under 13° 6.7 is found, and under 14° is 7.3; hence 7 would be found under 13°½. Now, under 13°, and opposite to 84 shillings = 4 guineas, is 18.9 in a departure column; and under 14° and opposite to 84 is 20.3, the mean 19.6 = 19s. 7d., which, added to 12l. 12s. the sum is 13l. 11s. 7d. the answer.\*

<sup>\*</sup> This might have been done, although not with the same degree of exactness, as follows:—In a departure column, 30 will be found opposite to 97 in a distance column, under 18°. Then, opposite to 84 in a departure column, is 272 in a distance column, which reduced to pounds, is 131. 12s. the answer nearly.

## TABLE XIV.

## Meridional Parts.

This table contains the meridional parts answering to each degree and minute of latitude. The degrees are expressed at the top, and the minutes in the marginal column: under the degree, and opposite to the minute in any given latitude, are the meridional parts, and conversely.

This table is used in Mercator's Sailing, and in constructing

charts, agreeable to Mercator's method of projection.

## TABLE XV.

## Dominical Letter.

It has been the custom, particularly among almanac makers, to denote the days in the year by the first seven letters of the alphabet; the same letter answering to the same day of the week in any year, and the first letter of the alphabet to the first day of the year. One of these letters must, therefore, denote all the Sundays throughout the year; and is hence called the Dominical Letter.\* If Sunday is the first day of the year, A is the dominical letter; if the year begins on Saturday, B is the dominical letter, &c.

In this table, even hundreds of years are contained at the top, and the intermediate years in the four first columns; under the one, and opposite to the other, is the dominical letter or letters for the proposed year. If there are two letters, the first answers from the beginning of the year to about the end of February, and the other serves for the remaining part of the year Every leap year has two dominical letters. By means of this and the following table, the day of the week answering to any given day of the month may be found; and conversely, if the day of the month be known within a few days. Also, the year, if known within certain limits, may be found from the day of the week and day of the month being given.

#### TABLE XVI.

# To find the Day of the Week answering to any given Day of the Month, &c.

The first vertical column contains the several months in the year, and that part of the other columns immediately opposite, contains the dominical letters: the under part contains the days of the month on which the Sundays happen; and hence, the other days of the week are easily found.

<sup>\*</sup> The dominical letters were introduced into the kalendar by the primitive Christians.

## PROBLEM I.

Given the year, month, and day of the month, to find the corresponding day of the week.

#### Rule.

Find the dominical letter answering to the given year in table XV; then find this dominical letter in table XVI, on the same horizontal line with the given month, and under it are the several days of the month upon which the Sundays happen; and hence the day of the week is known.

## EXAMPLE.

Upon what day of the week did the 18th of March, 1793,

happen?

By table XV, the dominical letter is F: now find F on the same horizontal line with March, under which are 3. 10. 17. 24. 31, the several Sundays in that month: hence, since the 17th day of the month is Sunday, the 18th is Monday.

#### PROBLEM II.

Given the year, month, the day of the week, and day of the month nearly, to find the exact day of that month.

## RULE.

Find the dominical letter for the given year by table XV, and the several Sundays in the month by table XVI; and, hence, the day of the month will be known.

#### EXAMPLE.

Whether was Thursday the 11th or 12th of March, 1795? The dominical letter for 1795 is D; under which, in table XVI, on the line with March are 1. 8. 15. 22. 29, the Sundays in that month; hence, since the 8th day of the month is Sunday, Thursday will be the 12th.

#### PROBLEM III.

Given the month, the day of the month, and the day of the week, and the year nearly; to find the corresponding year.

#### Pmr

In table XVI, find the dominical letter answering to the given day of the week and day of the month; then find this letter near the proposed limits, and the required year will be found.

#### EXAMPLE.

A person was born on Wednesday the 17th of October, but is uncertain whether the year was 1758 or 1759, required the exact year.

As the 17th of October happened upon Wednesday, the preceding Sunday was the 14th. Now, above the 14th day of the month, and oppossite to October is G. Then, in table XV, opposite to G is 1759, the year required.

## TABLE XVII.

# Refraction in Altitude.

A ray of light, from a heavenly body, in its passage through the atmosphere, describes a curve, which is convex towards that part of the heavens to which a tangent to the curve, at the extremity of it which meets the earth, would be directed. Hence, an object appears higher than it really is, and this apparent encrease of altitude is called the refraction.

The refraction is necessary for correcting altitudes of, and distances between the heavenly bodies, whether observed at sea or land. It is always to be subtracted from the observed altitude, or added to the zenith distance. This table is adapted to a mean state of the atmosphere in Britain, namely, to 29.6 inches of the barometer, and to 50° of Fahrenheit's thermometer. If the height of the mercury in these instruments be different from the mean, and if great precision is required, a correction is necessary to reduce the tabular to the true refraction. See the Author's Treatise on the Longitude, vol. i. page 82, and vol. ii. table VIII.

## TABLE XVIII.

# Parallax of the Sun in Altitude.

The difference between the places of the sun, as seen from the surface and from the centre of the earth at the same instant, is called the parallax of the sun in altitude.

This table contains the sun's parallax in altitude to every third degree. The parallax is always to be added to the apparent altitude, in order to obtain the true altitude. In observations of the sun taken at sea for the latitude, the parallax may be neglected; but for the longitude it must be taken into account.

## TABLE XIX.

# Correction of the Sun in Altitude.

The numbers in this table are the differences between the refraction and sun's parallax: these numbers are expressed in minutes and tenths of a minute, which is sufficiently accurate in computations for the latitude or apparent time. The correction is to be subtracted from the apparent altitude of the sun, in order to obtain the true altitude.

## TABLES XX. AND XXI.

# Dip of the Horizon.

The dip of the horizon is a vertical angle contained between a borizontal plane passing through the eye of an observer, and a line from his eye to the visible horizon.

The first of these tables contains the dip answering to a free or unobstructed horizon, and the numbers therein, as well as in the other table, corresponding to the height of the eye, are to be subtracted from the observed altitude when the fore-observation is used; but added thereto in the back observation. The dip in this table is expressed in minutes and tenths of a minute.

If the land intervenes, or a fog obscures the horizon, and the ship nearer to it than to the visible horizon when unconfined; and if the sun's limb is brought in contact with the line of separation of the sea and land, the dip will be considerably greater, and will encrease as the distance of the ship from the land diminishes. In this case, therefore, the distance of the ship from the land is to be found, and the dip answering thereto, and to the height of the eye, above the water, is to be taken from table XXI. Or the dip may be found independent of this table, by the rule given in the Author's Treatise on the Longitude, vol. i. page 290.

#### TABLE XXIL

# Semi-diameter of the Sun.

This table contains the angle subtended by the sun's semi-diameter at the earth, for every sixth day of the year. The months and days are contained in the first column, and the semi-diameter of the sun, expressed in minutes and tenths of a minute in the second column. This table being intended only for correcting the sun's altitude for the latitude, or finding the apparent time, it is, therefore, given in the same terms as the three preceding tables.

#### TABLE XXIII.

# - Augmentation of the Moon's Semi-diameter,

The apparent magnitude of an object encreases as the distance from the observer diminishes: and, since the moon is nearer the observer when in the zenith, than when in the horizon, by the earth's semi-diameter: therefore, the moon's semi-diameter encreases with its altitude; and this encrease is called the augmentation of the moon's semi-diameter. This table contains the augmentation to every third degree of altitude.

# TABLE XXIV.

# Declination of the Sun.

This table contains the sun's declination for the noon of each day, under the meridian of Greenwich, for four successive years. The declination is expressed in degrees and minutes.

## TABLE XXV.

# Reduction of the Sun's Declination to a future Period.

It has been customary to title a table of the sun's declination, so as to have the appearance of answering for several years, which is evidently fallacious. The present table is intended to reduce that of the sun's declination to a subsequent period. In the side column of the table are periods of 4, 8, &c. years to 20; and the months and each sixth day are at the top, opposite to the one, and under the other is the corresponding change of declination, which is to be added or subtracted, according as the sign above is + or—. If the time for which the sun's declination is required, be previous to the 28th February, 1800, the declination answering to the day following that given is to be taken.

## Examples.

I.

# Required the sun's declination 1st April, 1817? The given year is 12 years after 1805.

| Now, Sun's declination 1st April, 1805 | • | ٦ | 4º 29' N |
|--|---|---|----------|
| Equation to 12 years, table XXV.       | 7 | - | + 2      |
| Sun's declination 1st April, 1817      | ₹ | = | 4 31 N   |

#### II.

What is the sun's declination 17th October, at noon, anno 1826? The given year is 20 years after the year 1806.

| Now, Sun's declination 17th October 1806 | • | - | 9° 7′ S |
|--|---|---|---------|
| Equation to 20 years, table XXV,         | ٠ | - | + 3     |
| Sun's declination 17th October, 1826     | - | • | 9 10 S  |

The correction of declination may be found independant of the table, as follows:—

From the given year subtract as many times 4, as will reduce it to one of the years to which the table is adapted, and take out the declination answering to the given time as before; find also the declination answering to the following day, and multiply the difference between them by one-fourth of the difference between the given and tabular years, and the product divided by 33, will give the correction; which is additive when the declination is encreas-

ing, and subtractive when decreasing. If the given time is prior to that in the tables, the correction is to be applied in a contrary manner.

#### EXAMPLE.

Required the sun's declination, 12th March, 1827?

The given year is 24 years after 1803. Now the sun's declination 12th March, 1803, is 3° 34', and on the following day 3° 11', the difference is 23'. Then, 23' multiplied by 6, the number of fours in 24, gives 138, which, divided by 33, the quotient is 4, the correction; which, subtracted from 3° 34', because the declination is decreasing, gives 3° 30', the sun's declination 12th March, 1827.

## TABLE XXVI.

Reduction of the Sun's Declination to a different Meridian.

This table is intended to reduce the sun's declination, as given in the preceding table, to any other meridian than that of Greenwich, to which it is adapted, and to any given time of the day under that meridian. The arguments of this table are the ship's longitude, the time from noon, and the month and day of the month; the first of these is at the top of the table, the second at the bottom, and the month and day in the marginal columns. The titles at the top and bottom of these columns direct when the reduction is to be added or subtracted.

#### TABLE XXVII.

Right Ascensions and Declinations of the principal Fixed Stars.

This table contains the right ascensions and declinations of 61 principal fixed stars, adapted to the beginning of the year 1805. The fourth and sixth columns contain the annual variation in right ascension and declination, arising from the procession of the equinoxes, and combined with the proper motions of the stars: these serve to reduce the place of a star to a period, a few years after or before the epoch of the table, with tolerable accuracy. When the place of a star is wanted after the beginning of 1800, the variation in right ascension is additive, and that in declination is to be applied according to its sign. The contrary rule is to be used when the given time is before 1805.

The stars marked with an asterisk, are those used in the Nautical Almanack, for the purpose of determining the longitude by lunar observations.

#### TABLE XXVIII.

# The Right Ascension of the Sun.

This table is adapted to leap year, particularly the year 1804. In order to adapt this table to common years, one minute is to be

subtracted from the right ascension in the table, the first after leap year, two minutes the second after leap year, and three minutes the third year after leap year. And in the months of January and February, the right ascension is to be taken for the day following

that given.

This table is chiefly employed in nautical purposes, to find the time of transit of a fixed star; which is necessary to be known when the latitude is wanted from an observation of the meridian altitude of the star. And hence, also, the time of rising and setting of a star may be found; half the time of its continuance above the horizon being given.

#### PROBLEM I.

To find the apparent time of transit of a known fixed star.

#### RULE.

From the right ascension of the star, encreased by 24 hours, if necessary, subtract that of the sun, the remainder will be the approximated time of the transit of the star over the meridian of Greenwich: to this time apply the longitude, in time, of the given place, by addition or subtraction, according as it is west or east, which call the reduced time. Now, if the reduced time is less than three hours, the approximated time is the apparent time of transit of the star over the meridian of the place of observation. If the reduced time is between three and nine hours, one minute is to be subtracted from the approximate time: if between nine and fifteen hours, two minutes; if between fifteen and twenty-one hours, three minutes; and if above twenty-one hours, four minutes are to be subtracted from the approximate time, in order to obtain the apparent time of transit.

## Example.

Required the apparent time of transit of Rigel, 21st December, 1804, in longitude 45° W?

| Right ascension Rigel -<br>Sun's right ascension - | 5 <sup>h</sup> 5'<br>17 58 |          |                      |
|--|----------------------------|----------|----------------------|
| Approximate time of transit<br>Longitude in time   | 11 7                       | • • •    | - 11 <sup>h</sup> 7' |
| Reduced time                                       | 14 7,                      | Subtract | 2                    |
| Annarent time of transit                           |                            |          | 11.5                 |

## PROBLEM II.

To find the apparent time of the rising and setting of a known star, the latitude and day of the month being given.

#### RULE.

Find the apparent time of the transit of the star by the preceding problem; then, find half the time of the continuance of the star above the horizon, by table XLIV; which, being applied to the time of transit, by subtraction and addition, will give nearly the apparent times of the rising and setting of the star respectively.

Those who wish more exactness, are referred to the Author's Treatise on the Longitude, vol. ii.

#### EXAMPLE.

Required the apparent time of the rising and setting of Arcturus at London, 1st June, 1805?

| Right ascension, Arcturus                             |       | -             | •        | •              | •      | 14h | 7 <sup>4</sup><br>3 <i>5</i> |
|---|-------|---------------|----------|----------------|--------|-----|------------------------------|
| Right ascension of Sun                                | -     | -             | •        | ■.             | •      |     |                              |
| Approximate time of tran                              | sit   | -             | -        |                | •      | 9   | 32                           |
| Subtract -  | -     | -             | •        | -              | -      |     | 2                            |
| Apparent time of transit<br>To latitude 51° 31'N, and | deck  | <br>in. 200 l | S/ N. tl | <br>he half co | nt. of | 9   | 30                           |
| star above the herizon,                               | is    | •             | -        | -              | -      | 7   | <i>5</i> 0                   |
| Time, nearly, of rising                               |       |               |          |                | -      | 1   | 40                           |
| of setting  | -     |               |          |                | -      | 17  | 20, or                       |
| 5h 20', in the m                                      | ornin | g of the      | 2d of J  | une.           |        |     |                              |

#### TABLE XXIX:

# The Equation of Time.

This table contains the equation of time for leap-year, and is particularly adapted to the year 1804. By this table, however, the equation of time may be found for other years, as follows:—For the first year after leap-year, take one-fourth of the difference between the equations for the given and preceding days, which is to be added to the equation for the given day, if at that time the equation is decreasing, but subtracted therefrom if it is encreasing. In the second after leap-year, take half the difference between the equations; and in the third take three-fourths of the difference, and apply this correction in the same manner as before.

Time, as deduced from observations of the sun, is called apparent time, to which, the equation of time being applied according to its title in the table, gives mean time. And, since a watch, or time-keeper, is constructed upon the assumption of an uniform or equable motion, it is hence obvious this table is particularly useful in ascertaining the rate of a watch on mean solar time. Also, if a watch be regulated to mean time, then, the instant when the sun's meridian altitude ought to be observed, in order to find the latitude, is known by applying the equation of time to twelve hours, with a contrary title to that in the table.

## TABLE XXX.

To reduce the Time of the Passage of the Moon over the Meridian of Greenwich to the Time of its Passage over any other given Meridian.

This table is useful in finding the latitude from the meridional altitude of the moon, and in computing the apparent time, from the altitude of the moon, when observed off the meridian. The arguments of this table are, the daily retardation of the moon in passing the meridian, at the top, the time from the moon's southing in the left-hand marginal column; and the longitude of the place in the right-hand column. The corresponding equations are to be added, if the given time is after that of the moon's passage over the meridian, or if the longitude is west; but, if the time is before that of the moon's passage, or if the longitude is east, these equations are to be subtracted.

## TABLE XXXI.

Error of Observation, arising from an Inclination of the Axis of the Telescope, or Line of Sight, to the Plane of the Sextant.

If the line of sight is not parallel to the plane of the instrument, the observed angle will be greater than the truth; and this excess will encrease with that inclination, and with the angle observed: This table contains the error of observation arising from the above cause within probable limits, which error is always to be subtracted from the observed altitude of an object, or from the observed distance between two objects.

#### TABLE XXXII.

# Correction of the Moon in Altitude.

As this table is intended to be used in correcting the observed meridian altitude of the moon, in order to find the latitude, the numbers in it are, therefore, given only to the nearest minute, which is sufficiently exact for the above purpose. This correction is always to be added to the observed altitude to obtain the time.

#### TABLE XXXIII.

# Acceleration of the Fixed Stars.

The time of transit of a fixed star advances each day 3' 55".9, on mean solar time. Hence, in an observatory, the rate of a watch or clock may be accurately determined, by observing the transits of the fixed stars. Or, this may be done tolerably exact, by observing the instant of the disappearance of a star, during several successive nights, behind a fixed object, nearly in the meridian, the

position of the eye of the observer being also fixed. For this purpose, therefore, the first part of this table contains the acceleration of the fixed stars for 30 days. The second part of the table is useful for converting sidereal into mean solar time; or the converse, with sufficient accuracy for most nautical purposes.

#### TABLE XXXIV.

## Natural Sines.

This table is inserted here purposely for finding the latitude by double altitudes of the sun. The manner of taking out the natural sine answering to any given degree and minute, and conversely, is obvious. This table may be successfully applied in the solution of many problems, a few of which are the following.

#### PROBLEM I.

Given the course and distance run, to find the difference of latitude and departure.

## RULE.

Multiply the natural sine, and natural co-sine of the course, by the distance; the products, pointing off five figures to the right hand, will be the departure and difference of latitude respectively.

#### EXAMPLE.

A ship sailed S.SW. 150 miles, required the difference of latitude and departure?

| Nat. sine of |   |     |   |   |      | <b>82</b> 68, | Natur   | al co-sine | ٠ | - | .92988  |
|--------------|---|-----|---|---|------|---------------|---------|------------|---|---|---------|
| Distance     | • | • • | - | - | •    | 150           | -       | •          | - |   |         |
| Departure    | • |     | - |   | 57.4 | 0200,         | Diff. o | f latitude |   | - | 8.58200 |

#### PROBLEM II.

To find the product of two given numbers by the table of Natural Sines.

#### RULE.

Annex as many cyphers to the greater of the two given numbers as will make it consist of five places of figures; and to the less annex the same number of cyphers. Now, these numbers being considered as natural sines, find the degrees and minutes answering to each. Then, half the difference, or half the sum of the natural co-sines of the sum and difference of these arches, according as the sum is less or greater than a quadrant, will be the product required.

#### EXAMPLE.

# Required the product of 272 by 86?

|                   | . sine             | : | 150      | 47!<br>56 |                    |            | - |                |
|-------------------|--------------------|---|----------|-----------|--------------------|------------|---|----------------|
| Sum<br>Difference | •<br>•             | : | 20<br>10 |           | Nat. co<br>Nat. co |            | - | 93534<br>98212 |
|                   | Differe<br>Four fi |   | ures     | of pro    | -<br>oduct         | <b>-</b> . | - | 4678<br>2339   |

## PROBLEM III.

Given the latitude of a place, the altitude and declination of the sun, to find the apparent time of observation.

#### RILLE.

If the latitude and declination are of different names, let their sum be taken, otherwise their difference: then, from the natural co-sine of this sum or difference, subtract the natural sine of the corrected altitude of the sun, and find the log. of the remainder; to which add the log. secants of the latitude and declination: the sum of these being found in table XXXVII, will be the time from noon when the sun's altitude was observed; and hence the apparent time is known.

## EXAMPLE.

The 11th January, 1799, in latitude 57° 7'N, at 11h. 2' 43" A. M. per watch, the true altitude of the sun's centre was 10° 10', and declination 21° 46'S. Required the apparent time, and error of the watch?

| Latitude<br>Declination | -    |           | 7/<br>46     |   |             | -    |     | Ļ                 |     | ecant<br>secant | -    |   | <b>0.26526</b><br>0.03212 |
|-------------------------|------|-----------|--------------|---|-------------|------|-----|-------------------|-----|-----------------|------|---|---------------------------|
| Sum -<br>Altitude       | . ·  | 7,8<br>10 | <i>5</i> \$. |   |             | t. c |     | ine               |     | 19281<br>17651  |      |   |                           |
|                         | Di   | iffer     | ence         |   | -           |      | -   | •                 | •   | 1630            | log. | ÷ | 3.21219                   |
| Sun's dist. fr          | om n | nerio     | lian         | ı | Op          | 58/  | 26  | 5#                | · • | Risi            | ng   | • | 8.50957                   |
| Apparent ti             | me   |           | -            | • | iı          | 1    | 34  | <del>-</del><br>1 |     |                 |      |   |                           |
| Time per wa             | itch |           | •            |   | 11          | 2    | 45  | 3                 |     |                 |      |   |                           |
| Watch fast              |      | •.        |              | _ | <del></del> | 1    | - 6 | •                 |     |                 |      |   |                           |

## PROBLEM IV.

Given the latitude, the apparent time, and sun's declination, to find the true altitude of the sun.

#### RULE.

Take the logarithm answering to the sun's distance from the meridian, from table XXXVII, to which add the log. co-sines of

the latitude and declination; their sum, rejecting 20 from the index, is the log. of a natural number, which, subtracted from the natural co-sine of the difference between the latitude and declination, if of the same name, or from the natural co-sine of their sum, if of different names, will give the natural sine of the true altitude of the sun's center.

The refraction being added to, and the parallax subtracted from the true altitude, will give the apparent altitude of the sun's center.

#### Example.

Required the true and apparent altitudes of the sun at Newcastle, 17th October, 1802, at 8 h. 44' 20". A. M.

| Apparent time -                                      | 8h 44/ 20/                              | •            |                              |                                   |
|--|---|--------------|------------------------------|-----------------------------------|
| Sun's dist. from meridian<br>Latitude<br>Declination | 3 15 40<br>55 3 N.<br>9 3 S.            |              | rising<br>co-sine<br>co-sine | 4.59371<br>- 9.75805<br>- 9.99456 |
| · Sam  | 64 6                                    | Nat. co sine | 43680<br>19334               | 4.28692                           |
| True altitude sun -<br>Refraction<br>Parallax        | 14 <sup>6</sup> 5' 27"<br>+ 3 43<br>- 8 | Nat. sine    | 24346                        | ,                                 |
| Apparent alt. sun's center                           | 14 9 2                                  |              |                              |                                   |

# TABLES XXXV, XXXVI, XXXVII.

# Half Elapsed Time, Middle Time, and Rising.

The tables are employed in the computation of the latitude of a ship at sea, the latitude by account, two observed altitudes of the sun, the interval of time between them, and the sun's declination being given: they may also be applied in the solution of various other problems, as in the computation of the apparent time, the true azimuth of an object, the altitude and longitude of the nonagesimal, &c.

Table XXXV contains the log. co-secant of half the interval between the observations, and is hence called a table of HALF ELAPSED TIME. Table XXXVI. is named a table of MIDDLE TIME, and contains the log. sines of the corresponding arches, each diminished by 4.69897, the log. of half the radius. And table XXXVII. intituled a table of RISING, contains the log. versed sine of the corresponding arch, its index being diminished by 5. These tables are adapted to each tenth second of time, as far as six hours. And the rules for the several computations, which may be performed by them, may be so contrived, that any farther extension becomes unnecessary.

# TABLES XXXVIII, XXXIX, XL.

# To find the Correction of the Computed Latitude.

These tables are intended to find the correction of the latitude computed by double altitudes, in that case where more operations than one become necessary. The two first tables were drawn up by Mr. Brinkley; Professor of Astronomy, Dublin; and, together with their investigation, have been given in the Nautical Almanack for several successive years. The form of these tables is altered a little from the original, with a view to render them more easy to those seamen who are not well acquainted with decimal fractions.

#### TABLE XLI.

# Proportional Logarithms.

This table was first constructed for the express purpose of facilitating the method of finding the apparent time at Greenwich, answering to a given central distance between the moon and the sun, or a fixed star, by the assistance of the Nautical Almanack, for which purpose it is excellently adapted. It is extended to three hours, upon account of the distance being given in the Ephemeris to every three hours apparent time. As degrees and hours are similarly divided, it therefore equally answers for degrees.

This table is very useful in many calculations, especially those where sexagesimals are concerned.

#### TABLE XLII.

For computing the final Effect of Parallax on the Distance between the Moon and the Sun, or a Fixed Star.

This table, as its title implies, is used in finding the last correction of the computed distance between the moon and the sun, or a fixed star. See Navigation. It may also be applied to several fluxionary calculations.

#### TABLE XLIII.

# Amplitudes of a Celestial Body, reckoned from the Meridian.

The usual method of reckoning the amplitude is from the east or west points; however, as the azimuth is reckoned from the meridian, and as the amplitude may be called the *horizontal* azimuth; it is, therefore, evidently more proper, to reckon both either from the meridian, or from the east or west points. In this table the amplitude is reckoned from the meridian; and, therefore,

if the declination is north, the amplitude is to be reckoned from north; but if the declination is south, the amplitude is to be reckoned from the south, towards the east or west, according as the object is rising or setting. This table is extended to 231 degrees of declination, being the greatest declination of the sun, and to each degree of latitude as far as 60 degrees.

Upon account of the horizontal refraction, and the height of the eye above the water, the sun or a star, when in the true horizon, appears above it by a quantity equal to the sum of the horizontal refraction, and the dip of the horizon answering to the height of the observer above the water. If, therefore, the amplitude of the sun be observed when the center of that object is apparently in the horizon, a correction becomes necessary, which

may be found by the following rule.

To the log. tangent of the latitude, add the log. co-secant of the true amplitude, reckoned from the meridian, and the log. of the sum of the horizontal refraction and dip of the horizon, the sum, deducting 20 from the index, will be the log. of the correction of amplitude of the sun or a fixed star. When the latitude and declination of the object are of the same name, the correction is to be added to the observed amplitude, in order to obtain the corrected amplitude; but when of a contrary name, it is to be subtracted therefrom. Or the correction being applied to the true amplitude, as found in the table, or by calculation, by addition or subtraction, according as the latitude and declination are of a contrary or of the same denomination, will give the apparent amplitude.

If the observed object is the moon, then the sum of the horizontal refraction and dip is to be subtracted from the moon's horizontal parallax, and the remainder is to be used in the preceding rule: and the correction thus found is to be applied in a contrary manner to the former.

#### EXAMPLES.

Required the apparent amplitude of the sun at rising, answering to latitude 55° o' N, sun's declination 12° o' N, and height of the eve 10 feet ?

To latitude 55° o', and declination 12° o' N, the true amplitude is N 68° 46' E.

| Horizontal refraction Dip to 10 feet - | - ·93′<br>- <b>3</b>           | ,                           |   |   |
|--|--------------------------------|-----------------------------|---|---|
| Sum<br>Latitude<br>True amplitude -    | - 36<br>- 55° 0'<br>N 68 46 E. | log<br>tangent<br>co-secant | : | 1.556 <b>30</b><br>0.154 <b>77</b><br>0.030 <b>58</b> |
| Correction                             | - 65                           | log                         | - | 1.74160   |
| Apparent amplitude                     | - N 67 51 E.                   |                             |   |   |

#### II.

Required the apparent amplitude of the moon at setting, in latitude 48° N, the moon's declination being 20° S, horizontal parallax 58', and height of the eye 18 feet?

With the given latitude and declination, the true amplitude found in the table is S 59° 15' W.

| Horizontal refraction   | - \$3'       |           | •                           |
|-------------------------|--------------|-----------|-----------------------------|
| Dip to 18 feet -        | - 4          |           |                             |
| _                       | -            |           |                             |
| Sum                     | - 37         |           |                             |
| Moon's horizontal paral | lax 58       |           |                             |
|                         |              |           |                             |
| Difference              | - 21         | log       | <ul> <li>1.32222</li> </ul> |
| Latitude                | - 48 0       | tangent - | - 0.04556                   |
| True amplitude -        | - \$5915 W.  | co-secant | - 0.06580                   |
| •                       |              |           |                             |
| Correction -            | - 27         | log       | <b>- 1.49</b> 35 <b>8</b>   |
|                         | <del></del>  |           |                             |
| Apparent amplitude      | - \$58 48 W. |           |                             |

When the latitude and declination are expressed in degrees and parts of a degree, it will, when accuracy is wanted, be more expeditious to find the true amplitude by the common rule than by the table, thus:—the log. co-sine of the true amplitude is equal to the sum of the log. secant of the latitude, and the log. sine of the declination, rejecting 10 from the index.

## TABLE XLIV.

Half the Time of Continuance of an Object above the Herizon, the Latitude and Declination being of the same Name; or half the Time of Continuance under the Horizon, the Latitude and Declination being of a contrary Name.

This table contains the time of the semi-duration of an object above the horizon, when its declination is of the same name with the latitude of the place of observation; or the time of half its continuance under the horizon, when the latitude and declination are of a contrary denomination. Hence, if the object whose rising or setting is required, is the sun, this table gives the time of setting of that object, when the latitude and declination are of the same name, and the time of rising when of contrary names.\* But, in

<sup>\*</sup> The time of the rising and setting of the sun may be found independent of the table, by the following rule. To the tangent of the latitude, add the tangent of the declination; the sum, rejecting radius, will be the log. co-sine of an arch, which reduced to time, will be the time of the rising, the latitude and declination being of the same name, or the time of setting is of different names.

order to obtain the time of rising and setting of a fixed star or planet, the time of its culminating or passing the meridian must be first found. The method of finding the time of transit of a fixed star is shown in the explanation of table XXVI, and that of a planet may be found by the Nautical Almanack, page iv of the month. Now, to the time of transit of the given object, its semi-diurnal arch answering to its declination, and to the latitude of the place of observation, being applied by subtraction and addition, will give the time of rising and setting of the object.

The time of rising and setting, as found by this table, requires a correction, depending on the latitude and declination, and on the aggregate of the horizontal refraction, dip of the horizon, and horizontal parallax, which may be found as follows.

# 1. The object being the sun,\* or a fixed star.

Find the sum and difference of the natural co-sine of the declination, and natural sine of the latitude, and take half the sum of the logarithms of these quantities; to which add the constant log. 1.1761, and the prop. log. of the sum of the horizontal refraction and dip of the horizon, the sum, rejecting 10 from the index, will be the prop. log. of the correction, which is to be added to the time of rising, and subtracted from that of setting, as found by the table, in order to obtain the time of the apparent rising and setting of the object.

# 2. If the object be the moon.

The difference between the moon's horizontal parallax, and the sum of the horizontal refraction and dip, is to be used in the preceding rule, in place of the last quantity: and the correction thus found is to be applied in a contrary manner to that for the sun or a fixed star; the moon's horizontal parallax being the greater quantity.

#### TABLE XLV.

# Apparent Time of Transit of Pole Star.

This table is adapted to leap year, particularly 1804. In order to make it serve for other years, the time of transit must be taken for the day following that given in the months of January and February. For the first year after leap year, one minute is to be added to the time of transit given in the table; two minutes for the second, and three minutes for the third after leap year.

<sup>.</sup> The sun's parallax is here neglected, as its effect in this case is almost insensible.

Again, to reduce this table to a different meridian than that to which it is adapted, viz. Greenwich; if the longitude is between 45° E, and 45° W, there is no correction to be applied. If the longitude is between 45° and 135° E, one minute is to be added; but if it is between 45° and 135° W, one minute is to be subtracted. If the longitude is between 135° E, and 180°, two minutes are to be added, but subtracted if the given longitude is between 135° W, and 180°.

This table is useful to find the time when the altitude of the pole star ought to be observed, to find the latitude by its meridian altitude; it is also useful in finding the variation of the compass

by the pole star.

# TABLE XLVI.

Difference of Altitude of the Pole Star and the Pole, at different distances of the Star from the Meridian.

As the pole star is generally known, that no opportunity, therefore, may be lost for determining the latitude, this table is inserted, the use of which is as follows:—

Find the interval between the time of observation of the altitude of the pole star, and that of its passing the meridian,\* and take out the corresponding equation from the table; which added to, or subtracted from the true altitude of the pole star, will give the latitude of the place of observation.

#### EXAMPLES.

I.

Let the corrected altitude of the pole star be 46° to' N, observed 8h. 30' before its passage over the meridian. Required the latitude?

| True altitue | de of th | e pole s | tar | - `    | - | - | 46° | 10/1 | N. |
|--------------|----------|----------|-----|--------|---|---|-----|------|----|
| Equation fi  |          |          |     | h. 30' |   | - | + 1 | 5    |    |
| Latitude     | -        | -        |     |        | , | _ | 47  | 15 1 | ٧. |

II.

At 1 h. 10' after the passage of the pole star over the meridian, its altitude corrected was 58° 51'N. Required the latitude?

| True altitude-o | f the<br>table | pole stat<br>XLVI. | to 1 h. | 10' | - | - | <br>580<br>1 | 51′Ņ.<br>42 |
|-----------------|----------------|--------------------|---------|-----|---|---|--------------|-------------|
| Latitude        |                | -                  | :       | -   |   | - | 57           | 9 N.        |

<sup>\*</sup> If this interval is expressed in mean solar time, it ought to be reduced to sidereal time. This may be done with sufficient accuracy for most purposes, by adding the proportional part from table XXXIII, part 2d.

## TABLE XLVII.

# To find the Distance of Objects at Sea.

In this table, no allowance is made for terrestrial refraction, upon account of its uncertainty, as it varies, according to General Roy, from one-third to one-twenty-fourth part of the intercepted arch. Hence, the distance given by this table, will always be less than the apparent distance between the objects.

The distance between any two objects whose heights are given, is found by adding the distances answering to the given heights.

## EXAMPLES.

#### T.

At a place 104 feet above the level of the sea, with a telescope, a small portion of the main-top-gallant sail of a ship, which had sailed the day before, was observed apparently above the horizon. Now, the height of that part of the sail, which appeared in the horizon, above the sea, is 165 feet, the distance of the ship is required?

|             |     |      | the distance |   |   | - | 10.84<br>13.66 |
|-------------|-----|------|--------------|---|---|---|----------------|
| Distance of | the | ship | -            | ÷ | - | - | 24.50 miles.   |

## II.

The upper part of a light-house, whose height above the sea is 68 feet, was observed in the horizon, the height of the eye being 14 feet. Required the distance of the light-house?

| To height 68 feet, the distant<br>14 feet, the distant | ce is<br>ce is | • * * | • | 8 77<br>3.98 |
|--|----------------|-------|---|--------------|
|  |                |       |   |              |
| Distance of the light-house                            | -              | -     | - | 12.75 miles. |

#### REMARKS.

#### I.

If the given height exceeds the limits of the table, find the distance answering to one-fourth, one-ninth, one-sixteenth, &c. of the given height; which being multiplied by 2, 3, 4, &c. accordingly, will give the required distance.

#### EXAMPLE.

Let the height of a mountain be 9400 feet; required the distance when its top will be just visible, the eye being supposed to be in the horizon? One-fourth of 9400 feet is 2350, opposite to which in the table is 51.55 miles, which multiplied by 2 is 103.1 miles, the distance.

#### IT.

If the ratio of the horizontal refraction to the distance be given, the apparent distance will be obtained by increasing the distance found by the table accordingly.

# EXAMPLE.

The peak of Teneriff was observed in the horizon by a person. 150 feet above the surface of the sea; required the distance, the height of the peak being assumed to be 13280, and the terrestrial refraction one-tenth of the intercepted arch?

| As the given h<br>sixteenth of it be<br>Which multipl | taken, wh   | ich is 830      | , opp | osite to |   |     |   | )E-<br>-<br>- | 30.26           |
|---|-------------|-----------------|-------|----------|---|-----|---|---------------|-----------------|
| Distance answer                                       |             | 280 feet<br>-   | -     | • .      | , | • . | • | •             | 121.04<br>13.03 |
| Distance uncor  | rected by   | refraction<br>- |       |          |   |     |   |               | 134.07<br>13.41 |
| Distance corre  | cted by ref | raction         | -     | -        | - | -   | • | •             | 147.48          |

#### III.

The distance given in this table is expressed in nautical miles, of which 60 are contained in one degree: and there are 60.1 English miles in the same portion of the meridian. If, therefore, the distance is required in English miles, to the constant logarithm 0.06133 add the logarithm of the given distance in nautical miles, and the sum will be the logarithm of the distance in English miles.

#### Example. .

Let the distance expressed in nautical miles be 147½. Required the distance in English miles?

| Constant logarithm Distance in nautical miles |   | 147.5 |   | log. | 0.06133<br>2.16879 |
|---|---|-------|---|------|--------------------|
| Distance in English miles                     | • | 169.9 | - | •    | 2.23012            |

## IV.

The distance being given, the height is easily found; being the converse of the preceding operation.

## TABLE XLVIII.

To convert Degrees, &c. into Time, and conversely.

In column first of this table, are contained degrees and minutes, and in the second column the corresponding hours and minutes, or minutes and seconds: the other columns, titled D, are a continuation of the first; and those titled H, M, a continuation of the second. The manner of using this table will be obvious from the following examples.

# EXAMPLES.

T.

# Reduce 69° 23' to time?

| Opposite to to | 69 <sup>0</sup><br>23′ | in column 3d is<br>in column 1st is | • - | 4 <sup>h</sup> 36'<br>1 32" |
|----------------|------------------------|-------------------------------------|-----|-----------------------------|
| Hence          | 69 23                  | =                                   |     | 4 37 32                     |

II.

# Convert 5 h. 46' 24" to dégrees?

| Opposite to to |               | in column 4th is<br>in column 2d is |       | in col. 2d<br>in col. 1st |
|----------------|---------------|-------------------------------------|-------|---------------------------|
| -              | <del></del> , |                                     |       |                           |
| Hence -        | 5 46 24       | -                                   | 86 36 |                           |

# TABLES XLIX. AND L.\*

To find the Meridian Altitude of an Object, and hence the Latitude, from the Altitude observed a few Minutes before or ofter the Time of Transit of the Object.

In consequence of the interposition of clouds, it frequently happens that the sun, or other celestial objects, are observed when on the meridian. If, however, the altitude has been observed a few minutes before or after the time of the object's transit, the meridian altitude, and consequently the latitude of the place of observation, may be found by means of these tables, by the following

<sup>\*</sup> See Longitude, vol. ii. p. 254. Coleccion de Tablas, por Don Joseph de Mendoza y Rios. Madrid 1800. p. 87, &c.

## RULE.

Find the number in table XLIX, answering to the latitude by account, and the declination of the object, which, if the sun, is to be reduced to the meridian of the given place. Multiply this number by that from table L, answering to the given interval between the time of observation and noon, the product will be the difference between the observed and meridian altitudes, in seconds; which, reduced to minutes, and added to the observed altitude, the sum will be the meridian altitude; and hence, the latitude is found by the common rule.

## ' REMARK.

The interval between the time of observation and noon, may be found by equal altitudes, by a time-keeper, &c.

#### EXAMPLES.

## I.

April 22d, 1805, in latitude about 20° N, and longitude by account 65° E, the observed altitude of the sun's lower limb, 9' 51", after its passage over the meridian, was 81° 36' S, and height of the eye 30 feet: required the latitude?

| Sun's declination at noon,<br>Equation to 65° E.                   | at Greenwich                            |                                | 12° 8′ N.<br>— 4          |
|--|---|--------------------------------|---------------------------|
| Declination at noon, in lo   | ngitude 65° E.                          |                                | - 12 4 N.                 |
| Number from table XLIX<br>Number from table L, to                  | , to latitude 20°,<br>the given interva | and decl. 12° 4'<br>l·9' 51" - | 13"<br>97                 |
| Product  | • •                                     |                                | 1261 = 21'                |
| Observed altitude, sun's lo<br>Semi-diameter<br>Dip and refraction | ower limb                               | + 16}<br>- 5}                  | 81 36 <b>S.</b><br>- + 11 |
| True altitude Difference between the ob                            | oserved and merid                       | lian altitudes                 | 81 48<br>- + 21           |
| Meridian altitude  |   | • • •                          | 82 , 9 S.                 |
| Zenith distance -<br>Declination -                                 |   |                                | 7 51 N.                   |
| Latitude   |   | • •                            | - 19 55 N.                |

## II.

February 28th, 1806, in latitude 24° S. by account, the correct altitude of Sirius, seven minutes before the time of its transit, was 82° 14′ N. Required its meridian altitude, and the latitude of the place of observation?

| Number from table XLIX, to latitude 24°, and decl.<br>Number from table L, to interval 7' - | 16° 28′ | 12 <b>"</b> .7<br>49                  |
|---|---------|---------------------------------------|
| Product Altitude of Sirius  | :       | 622.5 = 10'<br>82 14                  |
| Meridian altitude of Sirius Zenith distance Declination                                     |         | - 82 24 N.<br>- 7 36 S.<br>- 16 28 S. |
| Latitude  |         | - 24 4 S.                             |

## TABLE LI.

To reduce the Longitude, Latitude, Right Ascension, Declination, Semidiameter, and Horizontal Parallax of the Moon, as given in the Nautical Almanack, to any given Meridian, and to any given Time under that Meridian.

This table might have been greatly contracted:—to prevent, however, any ambiguity to those not much acquainted with the method of taking out proportional parts, it is given in its present extended form. The proportional part answering to any given variation in twelve hours, is found by adding the parts answering to the several quantities that make up the whole difference in that period; which sum is to be added to the longitude, or right ascension of the moon at the preceding noon or midnight, rejecting 360° if either exceeds that quantity. And it is to be applied by addition or subtraction, to the latitude, declination, semi-diameter, and horizontal parallax of the moon, according as these quantities are increasing or decreasing.

## EXAMPLES

#### I.

Required the moon's longitude, the 16th February, 1806, at 7 h. 36' P. M.?

| Moon's longitude, 16th February, 186, at noon at midnight |               |           |         |      |      |      |    |   | 10s. 4° 0′ 10″<br>10 9 56 16 |    |    |    |
|---|---------------|-----------|---------|------|------|------|----|---|------------------------------|----|----|----|
| Variation in  | 12 hours      |           |         | -    |      | -    |    | - |                              | 5  | 56 | 6. |
| Proportiona   | d part to 7 h | . 36′, aı | , 5° 0  |      | Tabl | e Ll |    |   | -                            | 30 | 10 | -  |
|   |               |           | 0 50    | 0    | -    |      | •  |   | •                            |    | 31 | 40 |
|   |               |           | 0.6     | 0    | -    |      | •  |   | -                            |    | 3  | 48 |
|   |               |           | 0 0     | 6    | -    | •    | -  |   | •                            |    |    | 4  |
| Proportion  |               |           | 5 56    | -    |      | -    | is |   |                              | _  | 45 | 32 |
| Moon's lon  | gitude, 16th  | Feruar    | y, at I | 100n |      | •    | -  |   | 10                           | 4  | 0  | 10 |
| Moon's lon  | gitude at 71  | 6' P. 1   | M.      | -    |      | •    |    | - | '10                          | 7  | 45 | 42 |

#### TT.

Required the moon's horizontal parallax, the 11th March, 1806, at 5 h. 12' A. M. in longitude 58° W.?

The given time is between the 10th at midnight, and the 11th at noon. Hence,

| Moon's horizontal parallax, 10th March, at midnight 11th March, at noon | -               | -       | 55′ 36″<br>55 17                              |
|---|-----------------|---------|---|
| Variation in twelve hours   | -               | -       | 19  |
| Proportional part to 5 h. 12', and - 10" 9                              | -               | 4"<br>4 |   |
| Proportional part to 5 h. 12', and - 19                                 | •               | . 8     | •   |
| Proportional part to 58°, and - 10 9                                    |                 | 3       |   |
| Proportional part to 58°, and - 19                                      | -               | 6       | •   |
| Sum<br>Moon's horizontal partillax at midnight                          | -               |         | 14"<br>55 86                                  |
| Moon's horizontal parallax, at 5 h. 12', in longitude !                 | 58 <sup>6</sup> |         | 55 22   |
| Or,   |                 |         |   |
| Given time  | •               | • •     | 5 <sup>h</sup> 12 <sup>r</sup><br>3 <b>52</b> |
| Reduced time  | -               | -       | 9 4   |
| Proportional part to 9h. 4' and 19", is 14"                             | as b            | efore.  |   |

#### REMARKS.

#### I.

It is evident these operations may be much contracted, by taking out two or more of the proportional parts at once.

#### II.

This table will also be usful in reducing the sun's longitude, right ascension, and declination, to a given time and meridian, by finding the proportional part answering to the reduced time, and half the variation of the sun's notion in twenty-four hours.

# TABLE LII.

# Equation of Second Difference.

If the motion of the moon in tweve hours was uniform, the place of that object, as deduced by the receding table, would be correct. The motion of the moon, however, in twelve hours is almost always unequal; and, therefore, a correction becomes ne-

cessary—which correction is contained in this table, of which the arguments are, the mean of the two second differences of the moon's motion at the top, and the apparent time after noon or midnight in the side columns. This equation must be added to, or subtracted from the proportional part of the first difference of the moon's motion in twelve hours, found by the preceding table, according as that difference is decreasing or encreasing. Hence, the corrected proportional part, answering to the given interval, will be obtained.

If the given second difference is not found in the table, the sum of the equations answering to the several terms which make up the second difference, is to be taken.

#### ` Examples.

#### L

Required the moon's latitude, 13th April, 1806, at 2 h. 11' 36", A. M. apparent time under the meridian of Greenwich?

|             |      |             |                         | First diff.   |              |        |
|-------------|------|-------------|-------------------------|---------------|--------------|--------|
| Moon's lat. | 12th | at noon     | 3° 5′ 10″               |               | Second diff. |        |
|             |      |             |                         | 24' O"        |              | Mean.  |
|             | 12   | at midnight | <b>3 29 10</b>          |               | - 2' 12"     |        |
|             |      |             |                         | <b></b> 21 48 |              | 2/ 12/ |
|             | 13   | at noon     | <b>3 5</b> 0 <i>5</i> 8 |               | <b></b> 2 24 |        |
|             |      |             |                         | <b></b> 19 24 |              |        |
|             | 13   | at midnight | 4 10 22                 |               |              |        |

The difference of latitude between the 12th at midnight, and the 13th at noon, is 21' 48"; hence

|   | The propo                  | rtional part to                       | 2h. 11' 36",                    | and                   | 20' 0 | y/                   | is       |   | 3'        | 40"          |
|---|----------------------------|---------------------------------------|---------------------------------|-----------------------|-------|----------------------|----------|---|-----------|--------------|
|   |                            |                                       |                                 |                       | 1 0   | ) -                  |          | ۷ |           | 11           |
|   |                            | . —                                   |                                 |                       | Q 40  | ) .                  | -        | - |           | 7            |
|   |                            |                                       |                                 |                       | 0 8   | 3.                   | •        | - |           | 1            |
| T | herefore, pr<br>Equation o | reportional par<br>of second differen | t to 2h. 11' 3<br>ence to 2h. 1 | 6', and<br>1' 36", ar |       | 8 /<br>/ 0//<br>) 18 | is<br>is |   |           | 59<br>9<br>2 |
|   |                            | nal part correct<br>titude, 12th Ap   |                                 | midnight              |       |                      | •        | 3 | 4<br>29   | 10<br>10     |
|   | Moon's lat                 | titude, 18th Ap                       | ril, at 2h. 11                  | ' 36", A. I           | VI.   | -                    |          | 3 | <b>33</b> | 20 N.        |

#### II.

Required the moon's declination, 16th July, 1806, at 3 h. 42', P. M. apparent time under the meridian of Greenwich?

| Moon's decl. | 15th July, | at midnight | 19 <sup>0</sup> 21′ | First diff.      | Second diff.  |          |
|--------------|------------|-------------|---------------------|------------------|---------------|----------|
| *******      | 16         | at noon     | 17 20               | - 2 19°          | <b>— 18</b> ′ | Mean 16' |
|              | 16         | at midnight | 15 1                | - 2 19<br>- 2 33 | - 14          | - 10     |
|              | 17         | at noon     | 12 28               | ¥-33             |               |          |

| The first difference in the given   | interval      | is    | 20 19       | <b>′.</b> 1 | Hene    | ε,       |
|---|---------------|-------|-------------|-------------|---------|----------|
| Proportional part to 3 h. 49 and  | 2° 0′<br>0 19 | -     | is<br>-     |             | 000     | 87'<br>6 |
| Proportional part to 3h. 42' and<br>Equation of second difference to 3h. 42 |               | IR 84 | -<br>cond d | iÆ 10       | 6       | 43<br>2  |
| Proportional part corrected  Moon's declination, 16th July, at noon         | -<br>1 -      | •     | •           |             | 0<br>17 | 41<br>20 |
| Moon's declination, 16th July, at 3h.                                       | 42' P. M.     |       | •           | -           | 16      | 39       |

## TABLE LIII.

# Altitude to be observed, in order to ascertain the Apparent Time with the greatest Accuracy.

As the change of altitude is quickest when the object is in the prime vertical, the most proper time for observing an altitude, from which the apparent time is to be inferred, is, therefore, when the object is due east or west; other errors are, also, in this case avoided, particularly that arising from an error in the latitude by account at the time of observation. This table contains the altitude of an object, when in the above position. The declination is marked at the top, and the latitude of the place of observation in the side column.

Altitudes under 3° should not be employed in the computation of the apparent time, upon account of the uncertainty of the refraction near the horizon. During one-half of the year, or while the sun is on the other side of the equator, with respect to the observer, the sun is not due east or west while above the horizon; in that case, therefore, the observations for ascertaining the time must be taken while the sun is near the horizon; the altitude, however, not being less than 3°, for the reason assigned above.

#### EXAMPLE.

June the 1st, 1806, in latitude 50° N, by account, intending to ascertain the apparent time from observations of the sun, the altitude when that observation is to be made, that the apparent time may be inferred with the greatest accuracy, is required?

The sun's declination the 1st of June is 22°, under which, and opposite to 50°, the given latitude is 29° 17′, the required altitude.

## TABLE LIV.

# Hyperbolic Logarithms.

The logarithms in this table are of the kind first calculated by Baron Napier, and are called Hyperbolic Logarithms, upon account of their application to the determination of the quadrature of the assymptote spaces of the right-angled hyperbola. These logarithms are eminently useful in finding fluents, the sums of infinite series, &c.

The logarithm of any number in the regular progression, from 1.00 to 10.00, and from 10 to 1000, is found directly in the table; and the logarithm of any other number, not exceeding seven figures, may be found by the following rules.

#### PROBLEM I.

To find the Hyperbolic Logarithm of any given number.

#### FIRST.

If the given number is found in the table, the corresponding logarithm is that required.

## SECOND.

If the given quantity consists of a whole number, with a decimal annexed; and the integral part within the limits of the table.

## RULE.

Find the sum and difference of the given number, and the next less number in the table; then, the difference being divided by half the sum, and the quotient added to the hyperbolic logarithm of the next less number, the sum will be the hyperbolic logarithm of the given number.

#### THIRD.

If the given number exceeds 1000.

## RULE.

Let the three left-hand figures be considered integers, and the remaining figures decimals, and find the corresponding hyperbolic logarithm; to which add 2.3025851, the hyperbolic logarithm of 10, if the given number consists of 4 places of integers; 4.6051702, if it consists of 5 places; 6.9077553, if it consists of 6 places; 9.2103404, if it consists of 7 places of integers; carrying on the addition of the multiples of the hyperbolic logarithm of 10, according as the given number consists of more places of integers, and the sum will be the hyperbolic logarithm required.

# EXAMPLES.

Required the hyperbolic logarithm of 3.1415926?

The next less tabular number is 3.14, the sum of which, and the given number 3.1415926, is 6.2815926, and the half is 3.1407963; also the difference of the two first numbers is .0015926. Now, this difference being divided by half the sum; the quotient is 0.0005071, which added to 1.1442228, the hyperbolic logarithm

of the next less number 3.14, the sum 1.1447299 is the hyperbolic logarithm of the given number 3.1415926.

Required the hyperbolic logarithm of 365.24222?

| Given number -<br>Next less tab. number | <b>3</b> 65.24222<br><b>\$6</b> 5.   |      |                        |   |                    |
|---|--------------------------------------|------|------------------------|---|--------------------|
| Difference<br>Sum                       | .242 <b>22</b><br><b>730.2422</b> 2, | half | 365.12111              |   | 9.38421<br>2.56244 |
| Proportional part Hyperbolic log. of    | 3 <b>65.</b> -                       | •    | 0.0006634<br>5.8998974 | • | 6.82177            |
| Hyperbolic log. of                      | 365.2 <b>4222</b>                    | =    | 5.9005608              |   |                    |

# III. Required the hyperbolic logarithm of 785398?

| Given number -<br>Next less num in tab  | 78 <i>5.</i> 398<br>le 78 <i>5</i> . |      |  |   |              | • |                              |
|---|--------------------------------------|------|--|---|--------------|---|------------------------------|
| Difference - Sum                        | 398<br>1 <i>5</i> 70.398             | half | 785.199                                  | : | log.<br>log. | : | 9.59 <b>988</b> .<br>2.89498 |
| Proportional part<br>Hyperbolic log. of | 785.                                 | -    | 0.000 <i>5</i> 069<br>6.66 <i>5</i> 6837 |   |              | • | 6.70490                      |
| Hyperbolic log. of Add                  | 785.398 -                            | •    | 6.6661906<br>6.9077 <i>55</i> 3          |   |              |   |                              |
| Hyperbolic log. of                      | 785398                               | =    | 13.5739459                               |   |              |   |                              |

## PROBLEM II.

To find the number answering to any given Hyperbolic Logarithm.

#### RULE.

If the given logarithm is found in the table, the corresponding number is that required.

If the given logarithm is greater than 4.6051702, and less than

6.9077553.

Find the difference between the given, and the next less logarithm in the table; which being multiplied by twice the number answering to the next less logarithm, and divided by the excess of 2. above the given difference, will give the decimal to be annexed to the number answering to the next less hyperbolic logarithm to that given.

If the given hyperbolic logarithm is between 2.3025851 and 4.6051702, encrease it by 2.3025851, find the corresponding number, and remove the decimal point one place to the left. If less than 2.3025851, encrease it by 4.6051702, find the number answering thereto, and remove the decimal point two places to the left.

If the given hyperbolic logarithm is between 6.9077553 and 9.2103404, subtract 2.3025851 therefrom, find the number as before, and remove the decimal point one place to the right. If it is between 9.2103404 and 11.5129255, the log. 4.6051702 is to be

subtracted from it, and the decimal point is to be removed two places to the right, in the corresponding natural number.

The natural number answering to any given hyperbolic loga-

rithm may be found as follows:

Multiply the sum of 2. and the difference between the given and next less tabular logarithms, and divide the product by the excess of 2. above the said difference, the quotient will be the required natural number. Observing, that if the given logarithm is without the limits of the table, it is to be reduced thereto, by applying the logarithm 2.3025851, or its multiples, as before.

# Examples.

I.

Required the natural number answering to the hyperbolic logarithm 5.9005608?

| Given hyperbolic logarithm<br>Next less, which answers to | -   | <b>365.</b> | • | 5.9005608<br>5.8998974 |
|---|-----|-------------|---|------------------------|
| Difference  | - · |             |   | 0.0006694              |
| Traces of 0 shows the difference                          |     |             | _ | 1.0000000              |

Now, multiply 0.0006634 by 730, the double of 365, divide the product by 1.9993366, and the quotient .24222, annexed to 365, the sum 365.24222 is the number answering to the given hyperbolic logarithm.

| Or, | Difference<br>Constant r |          | -<br>ber | •           | 0.000<br>2.            | 6634                 |
|-----|--------------------------|----------|----------|-------------|------------------------|----------------------|
|     | Sum<br>Difference        | •        |          |             | 2.000                  |                      |
| Nex | Sum<br>t less tab. r     | -<br>num | . mw     | _<br>ltiply |                        | 06634<br>36 <i>5</i> |
|     |                          | •        | ,        |             | 1000<br>12009<br>60019 |                      |

Difference 1.9993366) 730,2421410 (365.24222. Number required, 59980098

> 39986732 42675480 39986732

2688748 (F 2)

يو ريا

## REMARK.

The above is inserted at full length, according to the common method of operation, but might have been greatly contracted. The easiest method, however, of finding the proportional part, according to the first rule, is by using common logarithms. Thus,

| Difference of given<br>Double No. 2018 were | and next l  | <b>0.0006634</b><br>730. | log.<br>log. | 6.82178<br>2.86332 |      |                    |
|---|-------------|--------------------------|--------------|--------------------|------|--------------------|
| Sum -<br>Excess of 2. above                 | the differe | nc <b>e</b>              |              | 1.9993366          | log. | 9.68510<br>0.30089 |
| Proportional part<br>Next less tabular n    | umber       | •                        |              | 0.24222<br>\$65.   |      | 9.38421            |
| Number required                             |             | •                        |              | 865.24222          |      |                    |

#### II.

Required the number answering to the hyperbolic logarithm of 13.5739459?

The given logarithm is without the limits of the table, therefore,

|  | <b>3.5739459</b><br>6.9077 <i>5</i> 58  |
|--|---|
| Remainder Next less log. which answers to 785      | 6.6661906<br>6.6656837 785 log 2.89487  |
| Difference   | 0.0005609 log 6.70492<br>2. log 0.30103 |
| Excess of 2 above the difference                   | 1.9994931 ar. co. log. 9.69908          |
| Proportional part 78 Next less tabular number - 78 | .398 9.599 <b>9</b> 0                   |
| Number 78  | 85.396                                  |

But, in order to bring the given hyperbolic logarithm within the limits of the table, it was diminished by three times the hyperbolic logarithm of 10, therefore, the decimal point must be removed three places to the right-hand; hence, the number answering to the given hyperbolic logarithm is 785398.

## TABLE LV.

To reduce Common to Hyperbolic Logarithms, and conversely.

In many operations it is necessary to reduce common to hyperbolic logarithms, and conversely; and therefore this table is inserted. The manner of using it will be obvious from the following problems.

#### PROBLEM I.

# To find the Hyperbolic Legarithm answering to a given Common Logarithm.

Divide the given common logarithm into periods of three figures each, beginning at the left, including the index, and annexing a cypher, if necessary, to the two right-hand figures, to make that period complete; then take out the hyperbolic logarithms answering to the several periods, and the sum will be the hyperbolic logarithm answering to the given common logarithm.

#### EXAMPLE.

Required the hyperbolic logarithm, answering to the common logarithm 0.4971498?

The given logarithm, divided into periods of three figures, beginning at the left-hand, with a cypher annexed to make the last period complete, will be as follows: 049.714.980. Now,

| The hyperb | olic log. of th | e First period<br>Second period | 049. is   | _  | 1.1282667 <b>0</b><br>164 <b>4045</b> |  |
|------------|-----------------|---------------------------------|-----------|----|---------------------------------------|--|
|            |                 |                                 |           | •  | - 225 <b>6</b>                        |  |
| Hyperbolic | logarithm of    | <b>-</b> , -                    | 0.4971498 | == | 1.14472971                            |  |

# PROBLEM II.

To find the Common Logarithm answering to a given Hyperbolic Logarithm.

#### RULE.

From the given hyperbolic logarithm, subtract the next less in the table, and take out the corresponding common logarithm. From the remainder subtract the next less hyperbolic logarithm, and find the corresponding number which is to be annexed to the former; and in this manner proceed, and the sum will be the corresponding common logarithm.

#### EXAMPLE.

Required the common logarithm, answering to the hyperbolic logarithm 5.90056075?

| Given hyp. log.<br>Next less hyp. log. | -       | 5.9005607 <i>5</i><br>5.89461784 | Correspon  | ding com, log. | 256 <sup>°</sup> |
|--|---------|----------------------------------|------------|----------------|------------------|
| Remainder -<br>Next less hyp. log.     |         | 594291<br>594067                 | <b>-</b> . | common log.    | 258              |
| Remainder -<br>Next less hyp. log.     | -       | 224<br>229                       |            | common log.    | . 097            |
| Common logarithm                       | equired |                                  | -          | -              | 2.56258097       |

# TABLE LVI.

# Lengths of Circular Arches.

This table is useful in finding the length of an arch of a circle, containing any number of degrees, and of a given radius, and conversely. The manner of using it will be obvious from the following examples.

EXAMPLES.

I.

Required the length of the circular arch of a bridge, containing 42° 24', the radius being 66 feet?

| Length to<br>Length to | 42° 0′<br><b>24</b> | <b>-</b> '   | 0.7330383<br>69813     |   |                    |
|------------------------|---------------------|--------------|------------------------|---|--------------------|
| Length to<br>Radius    | 420 24'             |              | 0.7400196<br>66        |   | ·                  |
|                        | ,                   |              | 4.4401176<br>44.401176 |   |                    |
| Length                 | -                   | <b>-</b> . ' | 48.8412936             | = | 84 feet 10 inches. |

TT.

Let the length of a circular arch, whose radius is 50 feet, be 46.9842650: Required the number of degrees it contains?

| The length, 46.9842650, divided by<br>Next less | <i>5</i> 0, is |                  |        | nd. arch 5 | 13°        |
|---|----------------|------------------|--------|------------|------------|
| Remainder                                       | . <b>-</b>     | 146608<br>145444 | •<br>• | -          | <i>5</i> 0 |
| Remainder                                       | -              | 1164<br>1164     | _      | -          | 94         |
| Hence, the corresponding arch is                | ,              | -                | -      | - 4        | 53 50 24   |

## III.

The span of a bridge is 80 feet, height, or versed sine of the circular arch 25 feet. Required the length, and number of degrees contained in the arch?

| The radius                   | $=\frac{40^2}{25}$ | + 25 = 6                | 4 + 25 = 89.     |   |                            |
|------------------------------|--------------------|-------------------------|------------------|---|----------------------------|
| Now, half span<br>Radius –   | -                  | 40<br>89                | - log.<br>- log. | - | 1.60206<br>1.94939         |
| Half arch -                  | , <b>- 2</b>       | 4 12                    | - tangent        | • | 9.65267                    |
| Whole arch Length of arch of | - 4                | 8 24.<br>48° 0'<br>0 24 | to radius 1.     | _ | 0,8377580<br>6981 <b>3</b> |
| Length of arch of<br>Radius  |                    | 48 24                   |                  | - | 0.8447393<br>89            |
|                              |                    |                         |                  | ` | 7.6026537<br>67.579144     |
| Leouth of arch               | _                  | _                       | `                |   | 75.1817977                 |

# TABLE LVIL

# Reciprocals of Numbers.

This table contains the quotients of unity, divided successively by the series of natural numbers, from 1 to 1000, extended to seven places of decimals, except those which terminate within that period, as the reciprocals of 2. 5. 8. &c.

By this table, vulgar fractions are expeditiously converted into decimal fractions of the same value: it is also useful in various

other calculations.

In order to reduce a vulgar fraction to a detimal, by this table, multiply the reciprocal of the denominator of the given fraction by its numerator.

| y na :         | muinci audi.                |         |         |       |          |                |        |            |      |       |       |               |
|----------------|-----------------------------|---------|---------|-------|----------|----------------|--------|------------|------|-------|-------|---------------|
| •              | •                           |         |         | Ex    | A MPI    | Es.            |        |            |      |       |       |               |
|                | 3                           |         |         |       | I.       |                |        |            |      |       |       |               |
|                |                             | Red     | luce    | T 7   | to       | a de           | cim    | al?        |      |       |       |               |
|                | The reciprocal<br>Numerator | of 17   | is<br>- | :     | :        | :              | •      | :          |      | 0.05  | 8823. | ;<br><b>3</b> |
|                | Decimal of 3                |         | -       | -     | -        | -              | -      | -          | -    | 0.17  | 6470  | •             |
|                |                             |         |         |       | II.      |                |        |            |      |       |       |               |
|                | Required t                  | he d    | ecir    | nal : | of 53    | . 3 <i>d</i> . | . ih t | erm        | s of | £.1   | ?     |               |
| <i>5</i> €. 3d | . reduced to a vi           | ulgar : | fract   | ion,  | is 2 1   | : No           | ow th  | e reci     | proc | al of | 80 is | 0.0125        |
|                | Numerator                   | . •     | -       | -     | - `      | <b>-</b> •     | -      | -          | -    | -     | -     | 21            |
|                | Decimal of 5s.              | 3d. is  | :       | •     | <b>-</b> | •              | -      | <b>-</b> , | -    | •     | •     | 0.2625        |
|                |                             |         | ~       |       | ·        |                | _      |            |      |       |       |               |

## TABLE LVIII.

# Square Roots of Numbers.

In this table the square roots of all whole numbers under root are contained: by it, however, the square roots of other numbers may be found nearly, by common proportion, or more exactly by the method of interpolation.

If the given number, whose root is wanted, consists of any number in the table with cyphers annexed, its square-root is found directly in the table, by removing the decimal point towards the right, half as many figures as there are cyphers annexed.

Thus, the square-root of 9700. is 98.488578, of 975000000 is 91224.9900.

#### TABLE LIX.

# Cube Roots of Numbers.

This table contains the cube-roots of all whole numbers under 300, and is extended to six places of decimals: its use is obvious from what has been said in the explanation of the preceding table.

## TABLE LX.

# Amount of f. 1, at Compound Interest.

This table contains the amount of  $\mathcal{L}.1$ , at the several rates of  $\mathfrak{Z}, \mathfrak{Z}, \mathfrak{$ 

EXAMPLE.

Required the amount of £.750, for 50 years, at 44 per cent.?

Amount of £.1 for 50 years, at £.4½ per cent. is - 9.03268 - 750 451.63150

6322,841

Or £. 6774 9 5<sup>2</sup>

£. 6774.47250

## TABLE LXI.

# Present Value of f. I, for Years, at Compound Interest.

The present value of f.1, from 1 to 60 years inclusive, and at various rates per cent., compound interest being allowed, is contained in this table. The present value of any given sum, payable at the expiration of any number of years less than 60, is found by multiplying the present value of f.1, for the given number of years, at the proposed rate per cent., by the given sum or principal.

#### EXAMPLE.

Required the present value of £.2500, payable 50 years hence, 5 per cent., compound interest being allowed?

Present value

£. 218.010000

## TABLE LXII.

Amount of an Annuity of f. I, for Years, at Compound Interest.

By this table, the amount of an annuity for any given time and sate, within the limits of the table, is found by the following rule.

Take out the amount of £.1, answering to the given time and.

rate of interest; which multiplied by the given annuity, the product will be the required amount.

#### EXAMPLE:

Required the amount of an annuity of £.200, in 10 years, at 5 per cent. compound interest?

| Amount of | £.1, in 1 | 0 <del>y</del> ears | , at 5 p | er cent.   | - | - | 12.57789   |
|-----------|-----------|---------------------|----------|------------|---|---|------------|
| Annuity   | -         | 1                   | -        | •          | • |   | 200        |
| Amount    | •         | -                   |          | <b>4</b> - | 4 | ÷ | 2515,57800 |

# TABLE LXIII.

Present Value of an Annuity of L.1, Compound Interest.

This table contains the present value of an annuity of £.1, for complete years as far as 60, and at various rates of interest. The use of this table in finding the present value of any given annuity for a number of years, and at a rate of interest within the limits of the table, is as follows:—

# PROBLEM I.

To find the value of an annuity for a given number of years, at a given rate of interest, the annuity commencing immediately.

#### RULE.

Multiply the tabular number, answering to the given years and rate of interest, by the given annuity, and the product will be the present value required.

#### EXAMPLE.

Required the present value of an annuity of £.20, which is to continue 50 years, rate of interest 5 per cent.?

| Under 5, and  | opposite | to 50 | ), is    | -        | - | - | 18.2559 <b>\$</b> |
|---------------|----------|-------|----------|----------|---|---|-------------------|
| Annuity       | •        | -     | •        | <b>-</b> | ÷ | • | 20                |
| Present value |          | •     | <u> </u> |          | • | - | 365.11860         |

#### PROBLEM II.

When the annuity does not commence till after a certain number of years.

#### RULE.

Multiply the difference between the tabular numbers answering to the time of commencement and end, at the proposed rate of interest, by the given annuity, the product will be the present value required.

EXAMPLE.

An annuity of £.40 per annum is to commence 20 years hence,
(G)

and is to continue 30 years: required its present value, the rate of interest being 4 per cent.?

| Under 4, and  | opposite | e to | 20, is | - | • | -   | 18.59088     | 3      |
|---------------|----------|------|--------|---|---|-----|--------------|--------|
| -             | -        |      | 50, is | - | - | -   | 21.48218     | 3      |
|               |          |      |        |   |   |     | <del></del>  | -      |
| Difference    | •        | •    | -      | - | - | -   | 7.89185      | 5      |
| Given annuity |          | -    | •      | - | - | -   | - 40         | )      |
| Present value |          | _    | _      |   |   | , _ | f. 315.67400 | -<br>o |

## TABLE LXIV.

The Annuity which f. 1 will purchase, Compound Interest being allowed.

The manner of using this table is obvious from what has been said relative to the preceding tables.

#### EXAMPLE.

A person intends to lay out £.500 in the purchase of an annuity to continue 10 years, the rate of interest being 5 per cent. Required the annuity?

| Under 5, and<br>Given princip |   | site to |              | is<br>- | - | - | - | .1     | 29504<br>500 |
|-------------------------------|---|---------|--------------|---------|---|---|---|--------|--------------|
| Annuity                       | - | •       | <del>;</del> | _       | - | - | £ | . 64.7 | 52000        |

# TABLE LXV.

# Probabilities of Life at different Places. -

This table exhibits the probabilities of life at different places, and is necessary for the calculation of annuities upon lives at these places. The number of persons born at the same time, are here reduced to the same number, viz. 1000, for the sake of more readily comparing the number of persons alive at different places, at any given age. Thus, at the age of 40 years, out of 1000 persons born at the same place at the same time, there will be 214 alive at London, and 369 alive at Edinburgh: hence Edinburgh is more favourable for human life than London.

The probability or chance, that a person of a given age shall continue in existence any proposed number of years, is easily found by this table, being expressed by a fraction, whose denominator is the number of persons alive at the present age, and numerator; the number alive at the age to which it is proposed to attain; and the chance of dying before the person reaches that period is a fraction, having the same denominator as before, and whose numerator is the difference between the numbers alive at the two ages. Thus, the probability that a person, residing in London, aged 30, shall live 20 years longer, or attain the age of 50, is  $\frac{1}{27}$ , or as 13 to 7 nearly; and the chance of his dying before he attains that age is expressed by  $\frac{1}{27}$ , or as 13 to 6 nearly.

# TABLES LXVI, LXVII, LXVIII.

For finding the Value of Annuities on Single and Joint Lives.

These tables were constructed by that ingenious mathematician, Mr. Thomas Simpson of Woolwich, upon the London bills of mortality. Their use is explained in the following problems.

#### PROBLEM I.

To find the Value of an Annuity for a given Single Life, at a proposed rate of Interest, within the limits of the Table.

#### RULE.

From table LXVI, take the number answering to the given age and proposed rate of interest, which multiplied by the given annuity, the product will be the required value.

#### EXAMPLE.

Required the value of an annuity of £.50, upon a single life, aged 40 years, according to the London bills of mortality, the rate of interest being reckoned at 4 per cent.?

| The value o | f an a | nnuity | of 1 | l. for | 40 ye | ars, at 4 per  | cent. is | -   | 11.5    |
|-------------|--------|--------|------|--------|-------|----------------|----------|-----|---------|
| Annuity     | -      |        | -    | • `    | -     | •              | -        |     | 50      |
| Value       | -      |        | _    |        | -     | · <del>-</del> | _        | 1 4 | . 575.0 |

## PROBLEM II.

To find the Value of an Annuity for Two Joint Lives.

#### RULE.

Multiply the number in table LXVII, answering to the given ages, and at the proposed rate of interest, by the given annuity, and the product will be the required value.

#### EXAMPLE.

Required the value of an annuity of £.60 for two joint lives, the one being 30, and the other 40 years, interest 4 per cent.?

| The number    | answering    | to 90 a      | and 40 year | s, and 4 p | er çent. is | - | 8.8<br>60    |
|---------------|--------------|--------------|-------------|------------|-------------|---|--------------|
| •             | <del>-</del> | <del>.</del> |             | :          |             | - | <del> </del> |
| <b>V</b> alue | -            |              | 7           | -          | *           | 4 | 528.0        |

## PROBLEM III.

To find the Value of an Annuity for the Longest of two given Lives.

#### RULE.

"Proceed 'as directed in last problem, using the number from table LXVIII, and the product will be the value.

# EXAMPLE.

What is the value of an annuity of £, 20 for the longest of two lives, the one 25 and the other 40 years, interest 4 per cent.?

 $(G_2)$ 

The tabular number answering to the given years and rate of interest Annuity

Value

**530.0** 

Those who wish farther information on this subject, may consult Dr. Halley's Tracts in the Philosoph. Transactions, Baron Maseres's Treatise on Annuities, Simpson's Select Exercises, Smart's Tables of Interest, De Moivre on the Valuation of Annuities, Dr. Price on Reversionary Payments, Morgan's Doctrine of Annuities and Assurances on Lives, &c.

# TABLES LXIX, LXX, LXXI, LXXII, LXXIII, LXXIV, LXXV.

These tables will be found very useful to Land-surveyors: the manner of using the four first is so obvious as to require no explanation. By table LXXIII, a distance measured on an inclined

plane, may be reduced to horizontal measure, as follows:

Multiply the number in table LXXIII, answering to the given inclination of the plane, by the measured distance; subtract the product (four figures being previously pointed off to the right-hand) from the given distance, and the remainder will be the horizontal distance.

# EXAMPLE.

A distance of 6 chains, 57 links, was measured on an inclined plane, the angle of inclination being 13° 20′. Required the horizontal measure?

The reduction to 19° 20' is .027, which multiplied by 657, the product is 17.737, or 17.7, which subtracted from 657, the remainder is 639.3, the horizontal measure required.

Table LXXIV may be applied to determine the angle contained, between two stations, from a given point: and table LXXV contains the quantity, expressed in inches and decimal parts of an inch, which is to be subtracted from that point on the rod belonging to a level ling instrument, to which the horizontal hair of the telescope of a level is directed, when properly adjusted, that the point may be obtained, which is on a level with the axis of the telescope. In order to render this table more generally useful, it is adapted both to the English and Scots chains.

## TABLE LXXVI.

# Properties of the Platonic Bodies.

A regular solid is that which is contained by like, equal, and regular plane figures, and whose solid angles are all equal: of these there are only five, and they are called *Platonic* bodies from the ancient philosopher Plato. By this table, the surface, solidity, &c. of any of these bodies may be very easily found, as follows:

## PROBLEM I.

## To find the Surface and Solidity of a Platonic Body.

#### RULE.

Multiply the number under surface corresponding to the given body, by the square of the diameter, the product will be the superficial content; and the number under solidity multiplied by the cube of the diameter will give the solid content required.

#### EXAMPLE.

Required the superficial and solid content of a dodecaedron, whose side is 10 feet?

| Tabular surface | = 20.6457788 | - solidity | - 7.6631189       |
|-----------------|--------------|------------|-------------------|
| Square of 10    | = 100        |            | - 1000            |
| Surface -       | 2064.57788   | - solidity | <b>7</b> 663.1189 |

#### PROBLEM II.

Given the Diameter of a Sphere, to find the Side of a Platonic Body that may be inscribed in the Sphere, circumscribed about it, or that is equal to the Sphere.

#### RULE.

Multiply the corresponding number in the table by the diameter of the sphere, and the product will be the side required.

#### EXAMPLE.

Required the side of an octaedron that may be circumscribed about a sphere, whose diameter is 20 inches?

| Tabular number |     |   | • | -  | •. | 1.5  | 22474 |
|----------------|-----|---|---|----|----|------|-------|
| Given diameter | ₹.  | - | - | ٠. | •  | -    | 20    |
| Side required  | ``_ | _ | _ | -  |    | 24.4 | 9480  |

The converse, &c. of these problems may also be easily resolved by means of this table:

#### TABLE LXXVIL

## Areas of Regular Polygons.

This table contains the areas of all regular polygons, from the trigon to the dodecagon inclusive; the side of each being 1. When the side is any other quantity, the area is found by multiplying the tabular number corresponding to the given polygon, by the square of the side of the proposed polygon. Thus, if the side of a pentagon be 50 yards, its area is = 1.7204774 × 2500 = 4301.193.

#### TABLE LXXVIII.

## To reduce English to French Measure, and conversely.

By part first of this table, English measure is reduced to French measure, as used before the revolution; and by part second, French measure is reduced to English. The numbers in column first may represent inches, feet, yards, toises, &c. and column second contains

the corresponding French measure, expressed in inches and decimals of an inch, feet and decimals of a foot, &c. The other two columns are similar to the former. The use of this table will be obvious from the following examples.

Ī.

The height of the mercury in the barometer is 30 415 inches English measure: required its height in French measure?

|       | 30.          | inches | = | 28.14918          |   |                      |
|-------|--------------|--------|---|-------------------|---|----------------------|
| •     | .4           | -      | - | <b>.37</b> 532    |   |                      |
|       | .01          | -      | - | .09383            |   |                      |
|       | <b>.0</b> 05 | •      | - | .00469            |   |                      |
|       |              | •      |   | <del></del>       |   |                      |
| Hence | 30.415       | ==     |   | 28.623 <b>0</b> 2 | = | 28 in. 7 lines .476. |
|       |              |        | 1 | T¥                |   |                      |

How many fathoms are equal to 57069 toises?

#### TABLE LXXIX.

Containing the Measures of the principal Lines and Angles, in regular Fortresses, from Four to Twelve Sides inclusive.

By this table the magistral line of a regular fort may be drawn, or any part of that line, as a bastion, &c.

#### TABLE LXXX.

To veduce the Divisions of the Nintey-six Arch of an Astronomical Quadrant, to Degrees.

The limb of an astronomical quadrant commonly contains two distinct sets of divisions; in one of which the quadrantal arch is divided into 90 degrees, as usual, and in the other into 96 equal parts; which last, upon account of the particular method of dividing it, is always considered as the most accurate. Each of these primary divisions is divided into 8 equal parts, and each of these is divided into 32 equal parts by a subdividing scale; and the difference, in seconds, between the two nearest divisions on the limb and subdividing scale, is found by a micrometer screw. The use of this table, therefore, is to reduce these divisions to degrees, which will be evident from the following example.

Let the apparent zenith distance of the sun's upper limb, by the nintey-six arch be 59 6 8 +  $4\frac{1}{2}$ , required the corresponding number of degrees, &c.?

#### TABLE LXXXI.

#### Climates.

A climate is a portion of the surface of the earth, contained between two circles parallel to the equator, and of such a breadth that the length of the longest day at the parallel nearer the pole, exceeds that of the longest day at the parallel next the equator, by some assigned portion of time.

At the equator the day is always of the same length, namely, 12 hours. At the polar circles, the length of the longest day is 24 hours; and at the poles it is six months: hence, climates are dis-

tinguished into two kinds, namely,

#### HOUR AND MONTH CLIMATES.

The hour climates, therefore, begin at the equator, and end at the polar circles. Now, as the length of the longest day at the extremity of an hour climate nearest the pole, exceeds the length of the longest day at the beginning, or other extremity of that climate by half an hour; and since from the equator to the polar circles, there is an encrease of 12 hours in the length of the longest day; there are, therefore, 24 climates between the equator and each polar circle, and hence 48 hour climates in all.

From what has been said, it is evident, the first hour climate begins at the equator, and ends at that parallel where the length of the longest day is 12 h. 30', which is also the beginning of the second; and the second ends at that parallel where the length of the longest day is 13 hours, which is the commencement of the third; and so on to the polar circle, where the hour climates end, and

the month climates begin.

The month climates begin at the polar circles, and end at the poles': the length of the longest day at the beginning of one climate exceeding that at the beginning of the next, by a month, or 30 days. Since the length of the longest day at the pole is six months, there are, therefore, six month climates between each polar circle and its respective pole; and, therefore, 12 month climates in all.—Hence, the number of hour and month climates together amount to 60.

In table LXXXI are contained the climates; column first contains the number of the climate; the second column, the length of the longest day at the end of each climate; the third, the latitude of the parallel bounding the end of the climate; and the fourth column, the breadth of each climate.

As all the tables of climates hitherto published, which the Author has had an opportunity of consulting, are erroneous; it was, therefore, thought proper to compute this table, which the reader may

verify by the following methods of computation.

## For Hour Climates.

To the log. co-sine of half the length of the longest day at the end of any climate, add the log. co-tangent of 23° 28', the sun's

greatest declination, the sum, rejecting radius, will be the log. tangent of the latitude required.

#### EXAMPLE.

Required the latitude of that parallel at the end of the 4th cli-

The length of the longest day at the end of the fourth climate is 14 hours; the half is 7 hours, which, reduced to degrees, is 105%

Now, half the length of the longest day in degrees 105° 0' co-sine 9.41300 Sun's greatest declination - - 23 28 co-tang. 0.36239

Latitude - 30 48 tang. 9.77539

#### IÌ.

#### For Month Climates.

To the log. co-sine of half the sun's motion in longitude in the given interval, add the sine of the obliquity of the ecliptic, the sum, rejecting radius, will be the co-sine of the required latitude.

Or, let half the number of days in the given climate be reckoned both ways from the time of the solstice; then, the complement of the mean of the declinations of the sun on these days, will be the latitude.

#### EXAMPLE.

Required the latitude of that parallel when the third month climate ends?

The length of the longest day, at the end of the third climate, is three months, of 90 days; the half of which, being subtracted from, and added to the 21st of June, gives May 7th and August 5th. Now, the difference between the longitude of the sun on these days is 2s 26° 4′, the half is 1s. 13° 3′ = 43° 3′

| Half sun<br>Obliquity | 's motion in<br>y of ecliptic | long.   |   | 43° 3′<br>23° 28  | •   | co-sine<br>sine | -          | 9.86377<br>9.6001 <i>2</i> |
|-----------------------|-------------------------------|---------|---|-------------------|-----|-----------------|------------|----------------------------|
| Latitude              |                               | -       | • | 73 5              |     | co-sine         | -          | 9.46387                    |
| Or,                   | Sun's declir                  | nation, |   | y 7th<br>gust 5th | • - |                 | 571<br>521 |                            |
| ,                     | Mean                          | •       | • | •                 | -   | 16              | 55         | •                          |
|                       | Latitude                      |         | - | <u>.</u>          | . + | 73              | ,5.        | •                          |

#### REMARK.

The latitudes of the parallels bounding the month climates in the southern hemisphere, will differ from those in the northern hemisphere.

#### TABLE LXXXII.

## To find the Number of Days contained between any Two Days of the Year.

This table is useful for many purposes, particularly in finding the interest for any given interval, and in various astronomical calculations. The manner of using this table is, by subtracting the number of days answering to the given day of the preceding month, from those answering to that of the following month, increased by 365 days, if necessary; observing, that if the preceding time be before, and the following after the end of February, in leap years, the above interval is to be encreased by one day.

#### Examples.

#### T.

Required the number of days between the 10th February and the 23d August, 1804?

| Number of days answering to 23d to 10th   | of 'August<br>of February | - | : | 235<br>41 |
|---|---------------------------|---|---|-----------|
| Interval - Add, because 1804 is leap year |                           |   | • | 194       |
| Interval                                  |                           |   |   | 195       |

#### II.

Required the number of days between the 21st September 1804, and the 18th March 1805?

| Number to 18 |          |          | which a | idd 365, tl | he sum is    | - | 442 |
|--------------|----------|----------|---------|-------------|--------------|---|-----|
| Number to 21 | st Septe | mber, is | -       | - '         | <u>-</u> ` . |   | 264 |
| Interval     |          |          | •       | -           | -            |   | 178 |

#### TABLE LXXXIII.

Containing the Number of Days between the Old and New Styles, in different Periods.

The first column of this table contains years before Christ, and the second, the number of days of difference between the styles. The other columns are a continuation of the former. Those days having the sign — prefixed, are to be subtracted from the old style, to reduce it to the new; and those having the sign + prefixed, or after the year 200 of Christ, when there was no difference, are to be added to the old stile to reduce it to the new. All the years in this table are leap years in the old stile; but those only having the letter L prefixed, are leap years in the new stile.

#### TABLE LXXXIV.

## Weights and Measures.

This table will be found necessary on many occasions; its use is obvious.

#### TABLE LXXXV.

## Specific Gravities.

If any body be weighed in air, and then in water, and the weight in air being divided by the difference between the weights, the quotient will express the relative weight of the body, with respect to water, which is called its specific gravity. Spring water is taken as the standard, a cubic foot of which weighs  $62\frac{1}{2}$  pounds avoirdupois, or 1000 ounces; and hence the numbers in this table express the number of avoirdupois ounces contained in a cubic foot of each body. Therefore, the weight of any body in the table, whose dimensions are given, may be found; or, if the weight is given, the corresponding number of cubic inches may be ascertained.

#### EXAMPLES.

T.

Required the weight of a block of marble, 8 feet long, 5 broad, and 3 feet thick?

The content of the stone, in cubic feet, is  $\equiv 8 \times 5 \times 3 \equiv 120$  feet; which multiplied by 2703, the specific gravity of marble, the product 324360 is the weight in avoirdupois ounces, or 9 tons I cwt.

II.

What is the content of a block of granite, which weighs 5 tons, 1 cwt. 3 quarters?

The given weight, reduced to ounces, is 182336, which divided by 3500, the specific gravity of granite, the quotient  $52\frac{1}{1.2}$  solid feet, is the required content.

#### TABLE LXXXVI.

Containing the Circumference and Area of a Circle, to a given Diameter.

If the diameter of a circle be below 12, with one decimal annexed, the corresponding circumference and area, expressed in the same measure, are found immediately opposite thereto.

If the given diameter is any whole number between 12 and 120, let the right-hand figure be considered a decimal, and take out the corresponding circumference and area, in the first of which remove the decimal point one place to the right-hand; and in the second it is to be removed two places.

If the given diameter be a multiple of any in the table, take out the circumference and area answering to the part, the first of which being multiplied by the divisor, and the second by the square of the divisor, will give the circumference and area required.

The circumference answering to any diameter, may be found by means of this table, by collecting the terms corresponding to those that make up the diameter. Then, one-fourth of the circumference multiplied by the diameter will be the area.

### EXAMPLES.

T.

Required the circumference and area of a circle, whose diameter is 78?

The given diameter, with one figure pointed off to the right is 7.8, opposite to which, we have the circumference 24.50442, and area 47.78362. Now, the decimal point being removed one place to the right hand, in the circumference, gives 245.0442, and two places in the area, gives 4778.362, the required circumference and area.

II.

Let the diameter of a circle be 256, required the corresponding circumference and area?

The given number exceeds 120; let it, therefore, be divided by some convenient number, as 4, then we have 64, one tenth of which is 6.4.

Now, to diameter 6.4 the circumf. is 20.10619 and area 32.16991 Hence, to diameter 64 the circumf. is 201.0619 and area 3216.991 Multiply the circumference by - 4 and area by 16

Circumference - 804.2476, Area 51471.856

#### 111

Required the circumference and superficial content of a circle, whose diameter is 437?

| To diameter<br>To diameter                  | - | 430<br>7  | : | the circumference is<br>the circumference is | : | 1350.885<br>21.99 <b>i</b>    |   |
|---|---|-----------|---|--|---|-------------------------------|---|
| Hence, to diar<br>One-fourth of<br>Diameter |   | 437<br>is | - | the circumference is                         | - | 1372.876<br>343.219<br>437    |   |
|   |   |           | ١ |  |   | 2402533<br>1029657<br>1372876 | , |
| ComanGaial aan                              |   |           |   | •  | _ | 40086.703                     | • |

#### Superficial content

#### TABLE LXXXVII.

Containing the Diameter and Area of a Circle, whose Circumference is given.

The same rules answer for this, as for the preceding table, and therefore, scarcely requires any farther illustration.

#### TABLE LXXXVIII.

To reduce the Diameters of Casks of the different Varieties, to a Mea Diameter.

The forms of casks, in consequence of the various degrees of curvature of the staves, are very different; and, therefore, for the more ready ascertaining their contents as nearly, and with as little trouble, as possible, they are generally distinguished into four forms or varieties; to one of which, any cask to be measured, is to be referred.

If the staves of the cask be much curved, it is considered to be the middle frustum of a spheroid, and contains more than any other cask, whose length, bung and head diameters are the same.

If the staves are straight between the bung and head of the cask, it is considered to be composed of the lower frustums of two equal cones; and contains less than any other cask, whose length, and bung, and head diameters are the same.

Between these, two other varieties are introduced. That nearest to the spheroid is taken to be the middle frustum of a parabolic spindle, and the other is considered to be the lower frustums of two equal parabolic conoids.

When the variety to which the cask belongs is ascertained, the bung and head diameters are to be reduced to a mean diameter, and hence the contents of the cask may be found as follows:

Find the difference between the bung and head diameters; then, in the table, and variety to which the cask belongs, opposite to the inches in the side column, and under the tenths of an inch, in the difference, at the top, is a number, which added to the head diameter, the sum is the mean diameter.

Now, to twice the logarithm of the mean diameter, add the logarithm of the length of the cask in inches; and to the sum add the constant logarithm 7.44491, if the content is wanted in ale gallons; or 7.53165, if in wine gallons; the sum, rejecting 10 in the index, will be the content of the cask.

#### EXAMPLE.

Let the length of a cask of the first variety be 42 inches, bung diameter 31.0 inches, and head diameter 24.7. Required the content of the cask in ale and wine gallons?

| Bung diameter<br>Head diameter | • | • | - | - |   | <b>-</b> | \$1.0 |
|--------------------------------|---|---|---|---|---|----------|-------|
| Head diameter                  | - | • | - |   | - | =        | 24,7  |
| Difference                     |   | _ | _ |   |   | -        | 6.3   |

Now, opposite to 6, and under 3, in the table of the first variety, is 4.06, which added to the head diameter, the sum 28.76 is the mean diameter. Then,

| Mean diameter 28.76 log. 1.<br>Length - 42 log. | .45879 ; | × 2 =          | 2.91758<br>1.62325                 |                  |                                   |
|---|----------|----------------|------------------------------------|------------------|-----------------------------------|
| Sum Constant log. for ale gallons               |          |                | <b>4.54</b> 083<br><b>7.44</b> 491 | for wine gall.   | <b>4.54083</b><br>7.5316 <b>5</b> |
| Content in ale gallons -                        | 96.77    | , <del>.</del> | 1.98574.                           | Wine gal, 118.16 | 2.07243                           |

#### TABLE LXXXIX.

#### Remarkable Æras and Events.

This table contains some remarkable epochs and events, reduced to the Julian period, the common received opinion of the creation of the world, and to that of the birth of Christ. The first of these was invented by J. Scaliger, and is the product of the cycles of the sun, moon, and indiction; that is, of 28.19 and 15, = 7980 years. Its commencement is placed prior to the creation of the world, and, therefore, includes all the other areas and events hitherto. When this period is completed, which will be in the year of Christ 3267 = 7980 — 4713, the second Julian period will begin.

By means of this table, the year of any other ara, &c. may be easily found, as follows.

#### EXAMPLES.

#### I.

Required the year of the zera of Nabonassar, answering to the year of Christ 1804?

| Given year of Christian æra<br>Æra of Nabonassar before Christ |               | or of the |          |   |      |
|--|---------------|-----------|----------|---|------|
| Year of the zra of Nabonassar                                  | 25 <b>5</b> 0 |           | <b>.</b> | - | 2550 |

Required the year of the Hegira corresponding to the year 1804 of the Christian æra?

|   | iven year of the Christian | n æra | - | - | 180 <b>4</b> |
|---|----------------------------|-------|---|---|--------------|
| A | Era of the Hegira `        | -     | • | ٦ | - 662        |
| Y | car of the Hegira -        |       | • | - | 1142         |

Since the Julian period is the product of the cycles of the sun, moon, and indiction; if, therefore, the years of these cycles answering to any year be given, the corresponding year of the Julian

period may be found as follows:

Multiply the constant number 4845 by the given year of the cycle of the sun, 4200 by that of the cycle of the moon, and 6916 by the year of the cycle of the indiction, and the sum of these three products being divided by 7980, the remainder will be the year of the Julian period.

EXAMPLE.

Let the solar cycle be 21, lunar cycle 19, and indiction 7: required the corresponding year of the Julian period?

Constant number for sun = 4845 × 21 = 101745 for moon = 4200 × 19 = 79800 for indiction = 6916 × 7 = 48412

> 7980)229957(28 15960 70357 63840

Corresponding year of the Julian period the year 1804 of the Christian æra. 5517, to which answers

#### TABLE XC.

## Logistic Logarithms.

A table of Logistic logarithms was first given by Mr. Jeremiah Shakerly, in his Tabula Britannica; and since Mr. Thomas Street has given another table of Logistic logarithms, in his Astronomia Carolina, of a different and more commodious form. These logarithms greatly facilitate those calculations where sexagesimals are concerned; which is almost always the case in taking, from astronomical tables, the equation answering to a given argument which differs by 60 minutes or seconds.

In using this table, if the first term of the analogy be 60, the sum of the logistic logarithm of the other two terms will be the logistic logarithm of the answer. And if the second or third terms be 60, the logistic logarithm of the other term subtracted from the logistic logarithm of the first, the remainder will be the logistic

logarithm of the answer.

## Examples.

Required the equation of the orbit of Jupiter, by M. de Lambre's tables, the mean anomaly being 5 s. 10° 51' 25"?

Tabular difference - 5' 43" - Logistic log. 1.0210

Excess above tab. anom. 51 25 - Logistic log. 0.0670

Proportional part - 4 54

Equation to 5s. 10° - 1 59 47

Equation to 5s. 10° 51' 25" 1 54 53

#### II.

Required the reduction, from the Cambridge tables, answering to a distance of 51°, the moon's altitude being 33°, and that of the star 12° 38'?

| 1 | o dist. 51°, alt. ) 33°, and alt.                | * 12° | , rcd. = | = 11'59"<br>10 12 |               |                  |
|---|--|-------|----------|-------------------|---------------|------------------|
|   | Difference                                       | -     | -        | 1 21<br>38 0      | logistic log. | 1.6478<br>0.1984 |
|   | Proportional part -<br>Reduction to alt 12°, &c. | -     | -        | 0 51<br>· 11 38   | ÷             | 1.8462           |
|   | Required reduction -                             | -     | -        | 10 42             | * • •         |                  |

#### III.

Required the altitude and longitude of the nonagesimal for Greenwich, by Dr. Maskelyne's tables; the right ascension of the meridian being 77° 28′ 42″?

| Alt. non. to 77°=        | = 61° 49′ 0″<br>61 52 40 | Long non. to 77 = 78                                 |   |    | 48/ 20/<br>30 40 | •                            |
|--------------------------|--------------------------|--|---|----|------------------|------------------------------|
| Difference<br>Excess -   | 3,40<br>28 42            | logis. l. 1.2139 Difference<br>logis. l. 3203 Excess |   |    | 42 20<br>28 42   | l. log. 1498<br>l. log. 3203 |
| Prop. part<br>Alt. to 77 | - 1 45<br>61 49 O        | 1.5342 Prop. part<br>Long. non. to 77                | 2 | 20 | 20 20<br>48 20   | 4701                         |
| Altitude                 | 61 50 45                 | Longitude  | 2 | 21 | 8 40             |                              |

Since logistic logarithms are analogous to proportional logarithms, those who wish more information, are referred to the second volume of the Author's Treatise on the Longitude.

#### TABLE XCI.

## For the Construction of Water Mills.

This table was given by Mr. Ferguson, in his Lectures on Select Subjects, for which he gives the following directions.

"The water wheel must not be too large, for if it be, its motion will be too slow; nor too little, for then it will want power: and for a mill to be in perfection, the floats of the wheel ought to move with a third part of the velocity of the water, and the stone to turn round once in a second of time.

"In order to construct a mill in this perfect manner, observe the following rules."

T.

Measure the perpendicular height of the fall of water, in feet, above that part of the wheel on which the water begins to act; and call that the height of the fall.

#### II.

Multiply this constant number 64.2882 by the height of the fall, in feet, and the square-root of the product shall be the velocity of the water at the bottom of the fall, or the number of feet that the water there moves per second.

#### III.

Divide the velocity of the water by 3, and the quotient shall be the velocity of the float boards of the wheel; or the number of feet they must each go through in a second, when the water acts upon them so as to have the greatest power to turn the mill.

#### IV.

Divide the circumference of the wheel, in feet, by the velocity of its floats, in feet, per second, and the quotient shall be the number of seconds in which the wheel turns round.

#### V

By this last number of seconds divide 60, and the quotient shall be the number of the turns of the wheel in a minute.

#### VI.

Divide 60, (the number of revolutions the mill-stone ought to have in a minute), by the number of turns of the wheel in a minute, and the quotient shall be the number of turns the mill-stone ought to have for one turn of the wheel.

#### VII.

Then, as the number of turns of the wheel in a minute, is to the number of turns of the mill-stone in a minute; so must the staves in the trundle, be to the number of cogs in the wheel, in the nearest whole numbers that can be found.

By these rules the following table is calculated, the diameter of the water-wheel being supposed to be 18 feet, which it is appre-

hended may be a good size in general.

To construct a mill by this table, find the height of the fall of water in the first column, and opposite to that height, in the sixth column is the number of cogs in the wheel; and in the seventh, the staves in the trundle, for causing the mill-stone to make about 60 revolutions in a minute, as near as possible, when the wheel goes with a third part of the velocity of the water. And it appears by the last column, that the number of cogs in the wheel, and staves in the trundle, are so near the truth for the required purpose, that the least number of revolutions of the mill-stone in a minute is between 59 and 60, and the greatest number never amounts to 61.

Such a mill as this, with a fall of water about  $7\frac{1}{2}$  feet, will require about 32 hogsheads every minute to turn the wheel with a third part of the velocity with which the water falls; and to overcome the resistance arising from the friction of the geers and attrition of the stones in grinding the corn.

#### TABLE XCII.

## For the Construction of Pumps.

This table was calculated by Mr. Booth, in which Mr. Ferguson made a few alterations, and extended it from 80 to 100 feet. In this calculation, Mr. Booth supposed the handle of the pump to be a lever encreasing the power five times; and had often found that a man can work a pump four inches diameter, and 30 feet high, and discharge  $27\frac{1}{2}$  gallons of water, English wine measure, in a minute. Now, if it be required to find the diameter of a pump, that shall raise water, with the same ease, from any other height above the surface of the well, find that height in the first column, and opposite thereto in the second, is the diameter or width of the pump, and in the third column is the quantity of water which a man of ordinary strength can discharge in a minute.

The wideness or narrowness of the pump, in any other part besides that in which the piston works, does not make the pump more or less difficult to work, except what difference may arise from the friction of water in the bore; which is always greater in a narrow bore than in a wide one, because of the greater velocity of the water.

#### TABLE XCIII.

This table, which was constructed by that celebrated mathematician, Mr. William Emerson, contains the length of a pendulum vibrating seconds at every fifth degree of latitude, together with the length of a degree of latitude, in English miles. For an account of the pendulum, its various properties, &c. the reader may consult that article, by the Author of this, in the Encyclopedia Britannica.

TABLE I.
The Latitudes and Longitudes of Places.

| Names of Places.            | Cont.          | Country.                | Sea, or Coast.            | Latitude.          | Longitude.        | High W |
|-----------------------------|----------------|-------------------------|---------------------------|--------------------|-------------------|--------|
| Aa River                    | Europe         | France                  | Eng. Chan.                | 50° 59′N           | 20 17/E           | 1145   |
| Aalbourg                    | Europe         | Denmark                 | Baltic Sea                | 56 50 N            | 9 46 E            | '      |
| Abbeville                   | Europe         | France                  | Eng. Chan.                | 50 7 N             | 1 49 E            | 10 30  |
| St, Abb's Head -            | Europe         | Scotland                | Ger. Ocean                | 55 55 N            | 2 10W             | 2 80   |
| Aberdeen                    | Europe         | Scotland                | Ger. Ocean                | 57 9 N             | -2:8₩             | 0 45   |
| Abo                         | Europe         | Finland                 | Bultic Sea                | 60 27 N            | 22 13 E           | Ì      |
| Abrevrack or Aubrevrac      |                | France                  | Eng. Chan.                | 48 32 N            | 4 20W             | 4 30   |
| Achen                       | Asia           | L Sumatra               | Ind. Ocean                | 5 22 N             | 95 34 E           |        |
| Achill Head -               | Europe         | L Achill                | Atl. Ocean                | 58 51 N            | 10 45W            | 7 0    |
| Adventure Bay -             | Asia           | N. Holland              | Pac. Ocean                | 48 23 S            | 147 80 E          | 4 36   |
| Adventure Island -          | Asia           | Soc. Isles              | Pacif.Ocean               | 17 5S<br>43 19 N   | 144 18W<br>9 28 E |        |
| Agde St. Agnes' lights -    | Europe         | France<br>Scil. Islands | Medit. Sea<br>Entr. Chan. | 49 54 N            | 6 19W             | 3 45   |
| Agra                        | Europe<br>Asia | India                   | MogulEmp.                 | 26 43 N            | 76 44 E           | 7 20   |
| Air                         | Europe         | Scotland                | Atl Ocean                 | 54 25 N            | 4 26W             | 10 80  |
| Aisla, rock at entr.Clyde   | Europe         | Scotland                | Atl. Ocean                | 55 15 N            | 5 5W              | 11 0   |
| Cape Ajnga                  | Amer.          | Peru                    | Pacif.Ocean               | 6 38 S             | 80 55W            |        |
| 'St. Albans' Head -         | Europe         | 1                       | Eng. Chan.                | 50 35 N            | 2 5W              | 8 30   |
| Albany River -              | Amer.          | N. So.Wales             | Hud. Bay                  | 52 35 N            | 85 23W            | . '    |
| I. Alboran                  | Africa         | Algiers ·               | Medit. Sea                | 36 ON              | 2 52W             |        |
| Aldborough                  | Europe         | England                 | Ger. Ocean                | 52 17 N            | 1 40 E            | 9 40   |
| Alderney                    | Europe         | England                 | Eng. Chan.                | 49 48 N            | 2 15W             | αq     |
| Aleppo                      | Asia           | Syria                   | Medit. Sea                | 35 45 N            | 37 20 E           | I      |
| Alexandretta                | Asia           | Syria                   | Medit. Sea                | 36 35 N            | 36 14 E           | 1.     |
| Alexandria                  | Africa         | Egypt                   | Medit. Sea                | 31 13 N            | 29 55 E           | l '    |
| l. Algeranca                | Africa         | Canaries                | Atl Ocean                 | 29 23 N            | 15 58W            | 1      |
| Algiers                     | Africa         | Algiers                 | Medit. Sea                | 36 49 N            | 2 13 E            | ł      |
| Alicant                     | Europe         | Spain                   | Medit. Sea                | 38 21 N            | 0 30W             | i.     |
| All Saints Bay              | Amer.          | Brazil                  | Atl. Ocean                | 13 5 S             | 38 50W<br>(47 40W | 6 0    |
| Amazons River, Mouths       | Amer.          | Terra Firma             | Atl. Ocean                | 0 30 S             | 49 25W            | 6 0    |
| Ambleteuse                  | Europe         | France                  | Eng. Chan.                | 50 48 N            | 1 37 E            | 11 0   |
| L Amboyna                   | Asja           | Molucca Is.             | Ind. Ocean                | 4 25 N             | 127 20 E          | i      |
| I. d'Ambre, N. point        | Africa         | is of France            | Ind. Ocean                | 20 5 S             | 57 37 E           | ł      |
| I Ambrym                    | Asia           | N. Hebrides             | Pacif.Ocean               | 16 10 S            | 168 7 E           |        |
| L Ameyland                  | Europe         | Unit. Prov.             | Ger. Ocean                | 53 90 N            | 6 15 E            | 7 40   |
| Amsterdam -                 | Europe         | Unit. Prov.             | Ger. Ocean                | 52 22 N            | 4 51 E            | .30    |
| L Amsterdam -               | Asia           | Friendly Is.            | Pacif.Ocean               | 21 98              | 174 46W           | 8 30   |
| Anchor Point -<br>Ancona    | Amer.          | Newfoundi.              | Atl. Ocean                | 51 15 N            | 56 47W<br>13 30 E | 9 0    |
| St. Andrews                 | Europe         | Italy<br>Scotland       | Medit, Sea                | 49 38 N<br>56 21 N | 2 49W             | 20.    |
|                             | Europe         | Scotiand                | Ger. Ocean                | 30 21 N            |                   | 1 0    |
| Angra                       | Europe         | Tercera                 | Atl. Ocean                | 38 39 N            | 27 12W            | 2 20   |
| Angra Bay                   | Africa         | Negroland               | Atl. Ocean                | 20 55 N            | 17 10W            | 3 40   |
| Anholt, lights -            | Europe         | Denmark                 | Sound                     | 56 54 N            | 11 40 E           | 0 0    |
| Cape Ann, lights -          | Amer.          | New Engl.               | Atl. Ocean                | 42 51 N            | 71 9W             | 10 0   |
| Annamocka -                 | Asia           | Friendly Is.            | Pacif.Ocean               | 20 16 8            | 174 30W           | 6 0    |
| Annapolis Royal -           | Amer.          | Nova Scotia             | B. Fundy                  | 44 52 N            | 64 5W             | 10 0   |
| Antibes                     | Europe         | France<br>Carib. Isles  | Medit. Sea                | 43 35 N            | 7 7 E<br>62 9W    | l      |
| Antigua, St. John's Antwerp | Amer,          | Flanders                | Atl. Ocean<br>R. Scheld   | 17 4 N<br>51 13 N  | 4 23 E            | 6 0    |
| i. Apæ                      | Europe<br>Asia | N. Hebrides             | Pacif.Ocean               | 16 46 S            | 168 27 E          |        |
| Aquapulco                   | Amer.          | Mexico                  | Pacif.Ocean               | 17 10 N            | 101 45W           |        |
| Aracta -                    | Asia           | Turkey                  | Medit. Sea                | 36 1 N             | 38 50 E           | 1      |
| Arbroath                    | Europe         | Scotland                | Ger. Ocean                | 56 94 N            | 2 37W             | 1 40   |
| Archangel                   | Europe         | Russia                  | White Sea                 | 64 34 N            | SS 58 E           | 6 0    |
| Arica                       | Amer.          | Peru                    | Pacif.Ocean               | 18 27 S            | 71 11W            |        |
| Arklow Head                 | Europe         | Ireland                 | Atl. Ocean                | 52 49 N            | 6 5W              | 9 3)   |
| Arles                       | Europe         | France                  | Medit. Sea                | 43 40 N            | 4 37 E            |        |
| I. Arran                    | Europe         | Scotland                | Atl. Ocean                | 55 39 N            | 5 12W             | 11 0   |
| L'Arrah                     | Europe         | Ireland                 | Atl. Ocean                | 54 48 N            | 9 -2W             | 11 0   |
|                             | • 1            | ,                       | ι                         | •                  | •                 | •      |

TABLE I.
The Latitudes and Longitudes of Places.

| <del></del>                    | <del></del>      |                         |                              |                     |                      | ·            |
|--------------------------------|------------------|-------------------------|------------------------------|---------------------|----------------------|--------------|
| Names of Places.               | Cont.            | Gountry.                | Sea, or Coast.               | Latitude.           | Longitude.           | RighWet.     |
| L Ascension                    | Africa           | Congo                   | Ethio.Ocean                  | 7 568               | 14 21W               |              |
| Ashley River -                 | Amer.            | Carolina                | Atl. Ocean                   | 33 22 N             | 79 55 E              | 0 45         |
| Assene River                   | Africa           | Guinea                  | Atl. Ocean                   | 5 50 N              | 2 25W                |              |
| I. Astores,                    | Africa           | Madagascar              | Ind. Ocean                   | 10 22 5             | 53 20 E              | 1 1          |
| Athens                         | Europe           | Turkey                  | Archipelag.                  | 38 5 N              | 23 52 E              | <b>.</b> .   |
| Atkin's Key                    | Amer.            | Bahama Is.              | Atl. Ocean                   | 22° 7′N             | 79° 51′W             | ł I          |
| Atwood's Keys                  | Amer.            | Bahama Is.              | Atl. Ocean                   | 21 22 N             | 72 45W               | † 1          |
| St. Augustine River            | Amer.<br>Africa  | Labradore               | GulfofSt.Law.                | 51 23 N             | 57 25W<br>49 8 E     | 1            |
| St. Augustine                  | Amer.            | Madagascar<br>Florida   | Ind. Ocean<br>Atl. Ocean     | 23 35 S<br>30 10 N  | 49 8 E<br>81 S4W     | 7 80         |
| St. Augustine                  | Aulei.           |                         |                              |                     |                      | 7 30         |
| Cape St. Augustine -           | Amer,            | Brazil                  | Atl Ocean                    | 8 48 8              | 85 5W                | į į          |
| Cape St. Augustine             | Asia<br>Asia     | Mindanao<br>N. Hebrides | Pacif Ocean                  | 6 40 N              | 126 20 E             | 1. 1         |
| Aurora Island Cape Ava         | Asia             | Japan                   | Pacif. Ocean<br>Pacif. Ocean | 15 8 S<br>34 45 N   | 168 17 E<br>140 55 E |              |
| I. Aves, Sotovento -           | Amer.            | Terra Firma             | Atl. Ocean                   | 11 30 N             | 66 48W               |              |
| Avignon                        | Europe           | France                  | Mediter.                     | 49 57 N             | 4 48 E               | ·            |
| Avranches                      | Europe           | France                  | Eng. Chan.                   | 48 41 N             | 1 22W                | 60           |
| Aydhab                         | Africa           | Egypt                   | Red Sea                      | 21 58 N             | 36 21 E              | - •          |
| Aylah                          | Asia             | Arabia                  | Red Sea                      | 29 8 N              | 35 36 E              |              |
| В.                             | ١                |                         |                              |                     |                      |              |
| Straits of Babelmandel         | Africa           | Abyssinia               | Red Sea                      | 12 50 N             | 43 45 E              | 0 0          |
| Baccareau Pas-age              | Amer.            | Sable Is.               | Atl. Ocean                   | 43 31 N             | 65. 41W              |              |
| Balade Harbour -               | Asia             | N. Caledonia            |                              |                     | 164 40 E             | 6 0          |
| Balasore<br>Ballabea Island -  | Asia             | India<br>N. Caladania   | B. Bengal                    | 21 20 N             | 86 OE                | 10 0         |
|                                | Asia             | N. Caledonia<br>Ireland | Pacif. Ocean                 |                     | 164 22 E             | 6 0          |
| Baltimore                      | Europe<br>Europe | England                 | Atl. Ocean<br>Germ. Ocean    | 51 16 N.<br>55 37 N | 9 30W<br>1 47W       | 4 30<br>3 30 |
| C See and 2                    | . "              | ., •                    |                              | \$3 37 B            | 107 10 E             | 3 30         |
| Banea Ist. [N.W. end]          | Asia             | Sunda Isles             | Ind. Ocean                   | 1 50 S              | 105 SO E             |              |
| Banff                          | Europe           | Scotland                | Germ. Ocean                  | 57 41 N             | 2 31W                | 00           |
| Banguey Peek -                 | Asia             | Malacca                 | Ind. Ocean                   | 7 18 N              | 117 17 E             |              |
| Cape Barbas                    | Africa           | Sanhaga                 | Atl. Ocean                   | 22 15 N             | 16 40W               |              |
| Barbuda Island                 | Amer.            | Caribbe Isles           | Atl. Ocean                   | 17 50 N             | 61 50W               |              |
| Barcelona                      | Europe           | Spain                   | Medit. Sea                   | 41 23 N             | 2 11 E               |              |
| Barfleur Light-house           | Europe           | France                  | Eng. Chan:                   | 49 42 N             | 1 17W                | 10 90        |
| Barnevelt's Islands -          | Amer.            | Terra delFue.           | S. Ocean                     | 55 49 S             | 66 58W               | 1            |
| St. Bartholomew Island         | Asia             | N. Hebrides             | Pacif. Ocean                 | 15 42 8             | 167 17 E             |              |
| Isle de Bas                    | Europe           | France                  | Eng. Chan.                   | 48 45 N             | \$ 55W               | 9 45         |
| Bass, rock                     | Europe           | Scotland                | Germ. Sea                    | 56 5 N              | 2 41W                | 2 15         |
| Basse-Terre                    | Amer.            | Guadaloupe              | Atl Ocean                    | 15 59 N             | 61 54W               | , I          |
| Bastia                         | Europe           | Corsica                 | Medit. Sea                   | 42 42 N             | 9 25 R               | -            |
| Batavia                        | Asia             | Java Is.                | Ind. Ocean                   | 6 11 8              | 106 52 E             | 1            |
| Bayeux                         | Europe           | France                  | Eng. Chan.                   | 49 17 N             | 0 43W                | 8 15         |
| Bayonne                        | Europe           | France                  | B. of Biscay                 | 43 29 N             | 1 30W                | 3 80         |
| Beachey Head                   | Europe           | England ,               | Eng. Chan.                   | 50 44 N             | 0 20 E               | 10 0         |
| Bear Bay                       | Europe           | Greenland               | N. Ocean                     | 79 10 N             | 24 10 E              |              |
| Bear Island - + St. Bees Head  | Amer.<br>Europe  | Labradore<br>England    | Hudson's Bay<br>Irish Sea    | 54 34 N<br>54 SI N  | 79 56W               | 0 0          |
| Belfast                        | Europe           | Ireland                 | Irish Sea                    | 54 49 N             | 9 48W<br>5 57W       | 10 0         |
| Bell lale                      | Europe           | France                  | B. of Biscay                 | 47 17 N             | 3 6W                 | 2 50         |
| Bell Rock                      | Europe           | Scotland                | Germ. Sea                    | 56 27 N             | 2 26W                | 3 0          |
| 7. 1 11                        |                  | 71 0                    | <del></del>                  |                     |                      |              |
| Bembridge Point -              | Europe           | Isle of Wight           | Eng. Chan.                   | 50 40 N.            | 1 5W                 | 10 15        |
| Bencoolen                      | Asia             | Sumatra                 | ind. Ocean                   |                     | 102 9 E              | · ·          |
| Bergen 7                       | Europe           | Norway                  | Atl. Ocean                   | 60 24 N             | 5 20 E               | 1            |
| Bermudas Island Point of rocks | Amer.            | Bahama Ieles            | Atl. Ocean                   | 32 9 N              | 64 54W               | 5 30         |
| Berwick                        | Europe           | Bfitain                 | Germ. Sea                    | 55 47 N.            | 2 5W                 | 2 80         |
| North Berwick -                | Europe           | Scotland                | Germ. Sea                    | 56 4 N              | 2 45W                | 20           |
| Beziers                        | Europe           | France                  | Medit. Sea                   | 43 20 N             | 3 12 E               |              |
| I du Bic                       | Amer.            | Acadia                  | Riv. St. Law.                | 48 30 N             | 68 41W               | 2 0          |
| Bilboa                         | Europe           | 1                       | B. of Biscay                 | 43 26 N             |                      | 8 1.5        |
| •                              | •                |                         | • 1                          |                     | •                    | •            |

TABLE I.
The Latitudes and Longitudes of Places.

| Names of Places.           | Cont.            | Country.                   | Sea, or Coast.              | Latitude.          | Longitude.          | HigbWat.     |
|----------------------------|------------------|----------------------------|-----------------------------|--------------------|---------------------|--------------|
| Blackeney River -          | Europe           | England                    | Germ. Sea                   | 59° 20'N           | 0° 50'E             | 6p 0,        |
| Black Point                | Europe           | Greenland                  | N. Ocean                    | 78 13 N            | 10 33 E             | 1 1          |
| Blanchart Race -           | Europe           | France                     | Eng. Chan.                  | 49 42 N            | 2 13W               | 90           |
| Cape Blanco                | Africa           | Negroland                  | Atl. Ocean                  | 20 55 N            | 17 10W              | 9 45         |
| Cape Blanco                | Amer.            | Patagonia                  | Atl. Ocean                  | 47 20 S.           | 64 42W              |              |
| Blavet, or Port Louis      | Europe           | France                     | B. of Biscay                | 47 43 N            |                     | 3 0          |
| Cape Bojadore -            | Africa           | Negroland                  | Atl. Ocean                  | 26 12 N            | 14 27W              | 1            |
| Bolabola                   | Asia             | Society Isles              | Pacif. Ocean                | 16 32 8            | 151 52W             |              |
| Bolschereskoi              | Asia<br>Asia     | Siberia                    | Pacif. Ocean                | 52 54 N<br>18 57 N | 156 37 E<br>72 38 E |              |
| Bombay                     | Asia             | India                      | Ind. Ocean                  | 16 37 N            | 72 JO E             |              |
| Bonavista Island -         | Africa           | C. Verd Isles              | Atl. Ocean                  | 16 6 N             | 22 47W              |              |
| Boston light-house -       | Amer.            | New Engl.                  | Atl. Ocean                  | 42 25 N            | 70 37W              | 10 0         |
| Botany Bay                 | Asia             | N. Holland                 | Pacif. Ocean                | 84 08              | 151 23 E            | 89           |
| Botany Island              | Asia             | N. Caledonia               |                             | 22 27 S            | 167 17 E            | 10 30        |
| Boulogne                   | Europe           | France                     | Eng. Chan.                  | 50 43 N            | 1 37 E              | 10 30        |
| Bourbon Island             | Africa           | Madagascar                 | Ind. Ocean                  | 20 52 S            | 55 30 E             | ا ہا ہا      |
| Bourdeaux                  | Europe           | France                     | B. of Biscay                | 44 50 N            | 0 35W<br>24 49W     | 80           |
| Brava Island               | Africa           | Cape Verd I.               | Atl. Ocean<br>R. Weser      | 14 50 N<br>53 5 N  | 8 49 E              | 60           |
| Bremen<br>Bressay Sound    | Europe<br>Europe | Germany<br>Shetland L      | Atl. Ocean                  | 60 11 N            | 0 49W               | 10 0         |
| Dicasay Goung              | Luope            | Augustian r                | ALLE OCCALL                 | 00 11 14           |                     |              |
| Brest                      | Europe           | France                     | B. of Biscay                | 48 23 N            | ' 4 81W             | 3 40         |
| Cape Brett                 | Asia             | N. Zealand                 | Pacif. Ocean                | 35 9 S             | 174 12W             |              |
| St. Bride's Bay            | Europe           | Wales                      | St.Geo.Chan.                | 51 48 N            | 5 23W               | 6 0          |
| Bridge Town                | Amer.            | Barbadoes                  | Atl. Ocean                  | 13 5 N             | 59 41W              |              |
| Bridlington Bay -          | Europe           | England                    | Germ. Sea                   | 54 7 N             | 0 1W                | 3 50         |
| Bridport                   | Europe           | England                    | Eng. Chan.                  | 50 40 N            | 2 55W               | 6 45         |
| St. Brieux                 | Europe           | France                     | Eng. Chan.                  | 48 31 N            | 2 43W               | 5 SO         |
| Brighthelmstone -          | Europe           | England                    | Eng. Chan.                  | 50 50 N<br>51 53 N | 0 5W<br>4 14 E      | 9 50<br>1 40 |
| Bristol                    | Europe<br>Europe | Unit. Prov.<br>England     | Germ. Ocean<br>St.Geo.Chan. | 51 28 N            | 2 35W               | 6 40         |
| 2                          | Zarope           | Rigina                     | onoco.cham.                 |                    |                     |              |
| Cape Bristol               | Amer.            | Sandwich L.                | Atl. Ocean.                 | 59 2 S             | 26 51W              |              |
| Brouage                    | Europe           | France                     | B. of Biscay                | 45 52 N            | 1 5W                | 3 50         |
| Buchan-ness                | Europe           | Scotland                   | Germ. Sea                   | 57 30 N            | 1 46W               | 0 0          |
| Buenos Ayres               | Amer.            | Brazil                     | Atl. Ocean                  | 34 35 S            | 58 31W              | l 1          |
| Cape Buller                | Amer.            | S. Georgia                 | Atl. Ocean                  | 53 58 8            | 37 40W<br>57 36W    |              |
| Burgeo Isles<br>Burgh Head | Amer.            | Newfoundl.<br>Scotland     | Atl. Ocean<br>Germ. Ocean   | 47 96 N<br>57 49 N | 3 30W               |              |
| Burlings                   | Europe<br>Europe | -Portugal                  | Atl. Ocean                  | 39 20 N            | 9 37 W              | 5 0          |
| Bustard Bay                | Asia             | N. Holland                 | Pacif. Ocean                | 24 4 S             | 151 42 E            | 8 0          |
| Button-ness                | Europe           | Scotland                   | Germ. Sea                   | 56 28 N            | 2 45W               | 20           |
| Button's Isles             | Amer.            | New Britain                | Hudson's St.                | 60 41 N            | 65 21W              | 6 50         |
| C.                         | l                |                            |                             |                    |                     |              |
| Port Cabello - =           | Amer.            | Terra Firma                | Atl. Ocean                  | 10 31 N            | 67 32W              |              |
| Cadiz                      | Europe           | Spain                      | Atl. Ocean                  | 36 31 N            | 6 12W               | 4 30         |
| Caen                       | Europe           | France                     | Eng. Chan.                  | 49 11 N            | 0 22W               | 9 0          |
| Caernarvon Cairo           | Europe           | Wales                      | St.Geo.Chan.                | 53 6 N<br>30 3 N   | '4 30W<br>31 21 E   | 8 30         |
| Outstance Dates            | Africa           | Egypt<br>Scotland          | Mediter. Sea<br>Germ. Sea   | 58 46 N            | 3 22W               | 90           |
| Calais                     | Europe<br>Europe | France                     | Eng. Chan.                  | 50 57 N            | 1 51 E              | 11 48        |
| Calcutta                   | Asia             | India                      | Ind. Ocean                  | 22 35 N            | 88 29 E             | *-           |
| Caliao                     | Amer.            | Peru                       | Pacif. Ocean                | 12 2 S             | 76 58W              |              |
|                            |                  |                            |                             |                    |                     | <b></b>      |
| Calmar                     | Europe           | Sweden                     | Baltic Sea                  | 56 40 N            | 16 22 E             | 1 !          |
| Canary Is. N.E. point -    | Africa           | Canaries                   | Atl. Ocean                  | 28 13 N            | 15 39W              | 3 0          |
| Candia Island              | Europe           | Turkey                     | Mediter. Sea                | 35 19 N            | 25 18 E             |              |
| Candlemas Isles            | Amer.            | Sandwich L.                | Atl. Ocean                  | 57 10 S            | 27 13W              | 8 30         |
| Cape Canso                 | Amer.            | Nova Scotia<br>Nova Scotia | Atl. Ocean<br>Atl. Ocean    | 45 16 N<br>45 20 N | 60 55W              | 8 30         |
| Cape Cantin                | Amer.<br>Africa  |                            | Atl. Ocean                  | 32 44 N            | 9 10W               | o o          |
| Canton                     | Asia             | Barbary<br>China           | Pacif. Ocean                | 23 8 N             | 113 2 E             | •            |
| Mull of Cantyre -          | Europe           | Scotland                   | Atl. Ocean                  | 55 17 N            | 5 41W               | 10 30        |
| Cape Capricorn             | Asia             | N. Helland                 | Pacif. Ocean                | 23 28 S            | 151 2 E             | 8 0          |
|                            | ŧ                | 1                          | 1                           |                    | ł                   | I            |
|                            |                  | <del> </del>               |                             |                    |                     |              |

TABLE I.

The Latitudes and Longitudes of Places.

| Names of Places.                              | Cont.            | Country.                | Sea, or Coast.               | Latitude.          | Longitude.          | HigbWat.      |
|---|------------------|-------------------------|------------------------------|--------------------|---------------------|---------------|
| larlescroon                                   | Europe           | Sweden                  | Baltic Sea                   | 56° 20′N           | 15° 26′ E           |               |
| Carthagena                                    | Europe           | Spain                   | Mediter. Sea                 | 37 37 N            | 1 8W                | l li          |
| arthagena                                     | Amer.            | Terra Firma             | Carib. Sea                   | 10 27 N            | 75 27W              |               |
| asan  | Asia             | Siberia                 | Pacif. Ocean                 | 55 44 N            | 49 8 E              | )             |
| laskets                                       | Europe           | Guernsey                | Eng. Chan.                   | 49 50 N            | 2 30W               | 8 15          |
| ape Cassipour -                               | Amer.            | Guiana                  | Atl. Ocean                   | 4 3 N              | 51 13W              | 50            |
| Castres                                       | Europe           | France                  | Mediter. Sea                 | 43 36 N            | 2 13 E              |               |
| t. Catherine's Isle -                         | Amer.            | Brasil<br>L'Coverns     | Atl. Ocean                   | 27 35 S<br>4 56 N  | 49 17W              |               |
| Cayenne                                       | Amer.            | I. Cayenne<br>France    | Atl. Ocean<br>Mediter. Sea   | 43 24 N            | 52 15W<br>3 41 E    | 50            |
| <del></del>                                   | Europe           |                         |                              |                    |                     | —— <u> </u>   |
| Charlotte Bay                                 | Amer.            | Nova Scotia             | Atl. Ocean                   | 44 34 N            | 68 55 <b>W</b>      | 80            |
| ape Charlotte                                 | Amer.            | S. Georgia              | Atl. Ocean                   | 54 32 S            | 36 11W              |               |
| 2. Charlotte's Foreland                       | Asia             | N. Caledonia            | Pacif. Ocean Gulf. ot Mex.   | 22 15 S<br>26 41 N | 167 13 E<br>82 37W  | ا ، ،         |
| Charlotte Harbour -                           | Amer.<br>Asia    | Florida<br>N. Zealand   | Pacif. Ocean                 | 41 6 S             | 174 14 E            | 8 0<br>9 0    |
| 2. Charlotte's Sound - :<br>Charlton Island - | Amer.            | New Wales               | Hud. Bay                     | 52 3 N             | 79 5W               |               |
| Chatham Island -                              | Asia             | N. Zealand              | Pacif. Ocean                 | 43 49 S            | 176 35 E            | · '           |
| Cape Cheators -                               | Asia             | China                   | Yellow Sea                   | 37 31 N            | 121 SS E            | ' 1           |
| Cheignecto                                    | Amer.            | Nova Scotia             | B. Fundy                     | 46 15 N            | 63 16W              | 0 45          |
| Cherbourg                                     | Europe           | France                  | Eng. Chan.                   | 49 38 N            | 1 38W               | 7 45          |
| Christiana                                    | Europe           | Norway                  | Sound                        | 59 55 N            | 10 48 E             |               |
| Christiansound                                | Europe           | Norway                  | N. Ocean                     | 63 7 N             | 7 42 E              |               |
| Christimas Harbour -                          | Asia             | Kerguelen'sL.           |                              | 48 41 S            | 69 4 E              | 10 0          |
| Christimas Sound -                            | Amer.            | Terra del Fue.          |                              | 55 22 S            | 70 3W               | 2 30          |
| t. Christopher's Island                       | Amer.            | Carib. Isles            | Atl. Ocean                   | 17 15 N            | 62 43W              |               |
| Churchill River                               | Amer.            | New Wales,              | Hudson's B.                  | 58 47 N            | 94 7W               | 7 20          |
| Civita Vecchia                                | Europe<br>Asia   | Italy                   | Mediter. Sea                 | 42 5 N<br>30 45 N  | 11 44 E<br>122 50 E | 1             |
| Clarence Island                               | Europe           | China<br>Ireland        | Yellow Sea<br>Atl. Ocean     | 50 45 N<br>51 18 N | 11 15W              | 4 30          |
| lerke's Isles                                 | Amer.            | S. Georgia              | Atl. Ocean                   | 55 5 S             | 34 42W              | 1 50          |
| Cloch, light-house -                          | Europe           | Scotland                | Atl. Ocean                   | 55 56 N            | 4 52W               | 11 0          |
| Cloven Cliff                                  | Europe           | Greenland               | N. Ocean                     | 79 53 N            | 9 59 E              | 1 1           |
| lythness                                      | Europe           | Scotland                | Germ. Sea                    | 58 20 N            | 3 7W                | 9 15          |
| Cape Cod, light -                             | Amer.            | United States           |                              | 42 5 N             | 70 19W              | 1             |
| Cape Colenet                                  | Asia             | N. Caledonia            | Pacif. Ocean                 | 20 30 S            | 164 56 E            | 1 1           |
| Cape Comorin                                  | Asia             | India                   | Ind. Ocean                   | 7 56 N             | 78 5 E              |               |
| Concale Bay - \ -                             | Europe           | France                  | Eng. Chan.                   | 48 44 N            | 1 44W               | 7 0           |
| Concarneau                                    | Amer.            | France<br>Chili         | B. of Biscay<br>Pacif. Ocean | 47 54 N<br>36 43 S | 3 55W<br>72 40W     | 30            |
| Conception                                    | Europe           | France                  | Atl. Ocean                   | 48 32 N            | 4 50W               | 2 15          |
| <del></del>                                   |                  |                         |                              |                    | <u> </u>            |               |
| Constantinople                                | Europe           | Turkey                  | Archipelago                  | 41 1 N             | 28 54 E             |               |
| Cooper's Isle                                 | Amer.            | S. Georgia              | Atl. Ocean                   | 54 57 S            | 36 4W               | j ·           |
| Copenhagen                                    | Europe<br>Europe | Denmark<br>Orkney Isles | Baltic Sea<br>N. Ocean       | 55 41 N<br>58 53 N | 12 35 E<br>2 45W    | 11 30         |
| Copensha Coquet Island                        | Europe           | England                 | Germ. Sea                    | 55 20 N            | 1 30W               | 3 0           |
| Coquimbo                                      | Amer.            | Chili                   | Pacif. Ocean                 | 29 54 S            | 71 16W              | ~ ~           |
| Cordovan, light-house                         | Europe           | France                  | B. of Biscay                 | 45 35 N            | i liw               | 4 30          |
| Cork  | Europe           | Ireland                 | St.Geo.Chan.                 | 51 54 N            | 8 28W               | 6 30          |
| Cape Coronation                               | Asia             | N. Caledonia            |                              | 22 5 S             | 167 8 E             |               |
| Cape Corse                                    | Africa           | Guinea                  | Atl. Ocean                   | 5 12 N             | 0 28W               | 3 30          |
| Corvo   | Europe           | Azores                  | Atl. Ocean                   | 39 42 N            | 31 6W               |               |
| Coutances                                     | Europe           | France                  | Eng. Chan.                   | 49 3 N             | 1 27W               | 6 0           |
| Cowes   | Europe           | Is of Wight             | Eng. Chan.                   | 50 46 N            | 1 20W               | 10 30         |
| lowsy Point                                   | Europe           | Scotland                | Germ. Sea                    | 57 45 N            | 3 17W               | 0 0           |
| Crinan Harbour                                | Europe           | Scotland                | Atl. Ocean                   | 56 5 N             | 5 29W               | ا يه ه        |
| Croisic<br>Cromarty                           | Europe .         | France<br>Scotland      | B. of Biscay                 | 47 18 N<br>57 43 N | 2 32W               | 3 45<br>11 40 |
| Cromer  | Europe           | England                 | Atl. Ocean<br>Germ. Sea      | 53 5 N             | 4 9W<br>0 51 E      | 7 0           |
| it. Cruz Island                               | Amer.            | Antilles                | Atl. Ocean                   | 17 49 N            | 64 53W              | ' "           |
| Cullen  | Europe           | Scotland                | Germ. Sea                    | 57 42 N            | 2 50W               | 0 0           |
|   | •                | •                       | ,                            |                    |                     |               |

TABLE I.
The Latitudes and Longitudes of Places.

| Names of Places.         | Cont.            | Country.                           | Sea, or Coast.           | Latitude.          | Isongitude.       | High Wat.     |
|--------------------------|------------------|------------------------------------|--------------------------|--------------------|-------------------|---------------|
| Cape Cumberland -        | Asia             | N. Hebrides                        | Pacif. Ocean             | 14° 39/S           | 166° 47/E         |               |
| Cumbray, light-house     | Europe           | Scotland                           | Atl. Ocean               | 55 43 N            | 4 57W             | 11 0          |
| Cummin Island            | Așia             | China                              | Yellow Sea               | °31 40'N           | 121 4 E           |               |
| D.                       | i '              |                                    |                          |                    | 1                 |               |
| Dantzic                  | Europe           | Poland                             | Baltic Sea               | 54 22 N            | 18 34 E           |               |
| Dartmouth                | Europe           | England                            | Eng. Chan.               | 50 21 N            | 3 42W             | , 6 30        |
| Dassen Island            | Africa           | Caffres                            | Atl. Ocean               | 33 25 S            | ,18 2 E           | 1             |
| St. David's Head -       | Europe           | Wales                              | St.Geo.Chan.             | 51 55 N            | 5 27W             | 6 0           |
| Deadman's Point -        | Europe           | England                            | Eng, Chan.               | 50 13 N            | 4 53W             | 5 10          |
| St. Denis                | Africa<br>Amer.  | I. Bourbon                         | Ind. Ocean<br>S. Ocean   | 20 52 S<br>54 33 S | 55 80 E<br>65 14W |               |
| Cape Diego               | Europe           | Ter. del Fueg<br>France            | Eng. Chan.               | 49 55 N            | 1 4 E             | 10 30         |
| Cape Diggs               | Amer.            | Labradore                          | Hudson's Bay             |                    | 78 51W            | 0 0           |
| Cape Diggs, or C. Dudley | Amer.            | Greenland                          | Baffin's Bay             | 76 48 N            | 59 12W            |               |
| 1 68 ,                   |                  |                                    |                          |                    | -                 |               |
| Dingle Bay               | Europe           | Irelaud                            | Atl. Ocean               | 51 55 N            | 10 40W            | 3 30          |
| Cape Disappointment      | Amer.            | S. Georgia                         | Atl. Ocean               | 54 58 S            | 36 15W            |               |
| Cape Disseada            | Amer.            | Ter. del Fue.                      |                          | 55 4 S             | 74 18W            |               |
| Dol                      | Europe           | France                             | Eng. Chan.               | 48 33 N            | 1 46W             | 60            |
| Dominica Island -        | Amer.            | Windw. I.                          | Atl. Ocean               | 15 18 N            | 61 28W            |               |
| St. Domingo              | Amer.            | Hispaniola                         | Atl. Ocean               | 18 20 N<br>51 47 N | 69 46W<br>4 35 E  | 3 0           |
| Dort                     | Europe<br>Europe | Unit. Prov.<br>I. of Man           | Germ. Sea<br>Irish Sea   | 51 47.N<br>54 7 N  | 4 35 E<br>4 38W   | 3 0<br>10 30  |
| Douglas                  | Europe           | England                            | Eng. Chan.               | 51; 8 N            | 1 18 E            | 11 30         |
| Drontheim                | Europe           | Norway                             | N. Ocean                 | 63 26 N            | 10 22 E           | 11 00         |
|                          |                  | 2102.1149                          |                          |                    |                   |               |
| Dublin                   | Europe           | Ireland                            | Irish Sea                | 53 21 N            | 6 6W              | 9, 15         |
| Dunbar                   | Europe           | Scotland                           | Germ. Sea                | 56 1 N             | 2 33W             | 230           |
| Dunbarton                | Europe           | Scotland                           | Atl. Ocean               | 53 57 N            | 4 31W             | 11 15         |
| Duncansby Head -         | Europe '         |                                    | Germ. Sea                | 58 40 N            | 3 7W              | 8 20          |
| Dundee                   | Europe           | Scotland                           | Germ. Sea                | 56 28 N            | 2 58W             | 2 10          |
| Dungarvon                | Europe           | Ireland                            | Atl. Ocean               | 52 0 N             | 7 50W             | 4 30          |
| Dungeness Dunkirk        | Europe           | England                            | Eng. Chan.               | 50 52 N<br>51 2 N  | 0 59 E<br>2.22 E  | 9 45<br>11 48 |
| Dunnose                  | Europe<br>Europe | France<br>L of Wight               | Eng. Chan.<br>Eng. Chan. | 50 33 N            | -1 16W            | 9 45          |
| Dusky Bay                | Asia             | N. Zealand                         | Pacif. Ocean             | 45 47 S            | 166 18 E          | 10 57         |
| E.                       |                  | 211 250000000                      | 1 444                    |                    | ,                 | 30 0          |
| Eaoowe Island            | Asia             | Friendly Is.                       | Pacif. Ocean             | 21 24 S            | 174 30W           |               |
| East Cape                | Asia             | N. Zealand                         | Pacif. Ocean             | 37 42 S            | 178 30W           |               |
| Easter Island            | Amer.            | Chili                              | Pacif. Ocean             | 27 7 S             | 109 47W           | 20            |
| Eddystone                | Europe           | England                            | Eng. Chan.               | 50 8 N             | 4 24W             | 5 30          |
| Edinburgh                | Europe           | Scotland                           | Germ. Sea                | 55 58 N            | 3 12W             | 2 20          |
| Elly                     | Europe           | Scotland                           | Germ. Sea                | 56 12 N<br>56 2 N  | 2 52W             | 2.0           |
| Elsineur<br>Embden       | Europe           | Denmark                            | Baltic Sea<br>Germ. Sea  | 56 2 N<br>53 12 N  | 12 37 E<br>7 16 E | 0 30          |
| Enatum Island -          | Europe<br>Asia   | Germany<br>N. Hebrides             | Pacif. Ocean             | 20 10 S            | 170 4 E           | 0.30          |
|                          |                  |                                    | - ucm Occan              |                    |                   |               |
| Enchuysen                | Europe           | Unit. States                       | Germ. Sea                | 52 42 N            | 5 9 E             | 0 0           |
| Endeavour River -        | Asia             | N. Holland                         | Pacif. Ocean             | 15 26 S            | 145 11 E          | 9 30          |
| English Road             | Asia             | Eacowe                             | Pacif. Ocean             | 21 20 S            | 174 S4W           |               |
| Erramanga Island -       | Asia             | N. Hebrides                        | Pacif. Ocean             | 18 46 S            | 169 18 E          |               |
| Estaples                 | Europe           | France                             | Eng. Chan.               | 50 32 N            | 1 40 E            | 11 0          |
| Evout's Isles            | Amer.            | Terra del F.                       | S. Ocean                 | 55 S4 S            | 66 59W            | 10.00         |
| Exeter<br>Eyemouth       | Europe           | England<br>England                 | Eng. Chan.               | 50 44 N<br>55 58 N | 3 34W<br>2 9W     | 10 30         |
| Exmouth Bar              | Europe<br>Europe | Engl <b>and</b><br>Engl <b>and</b> | Germ. Sea<br>Eng. Chan.  | 50 37 N            | 3 27W             | 6 20          |
| F.                       | Lucope           | - in Branke                        |                          | 00 01 11           | 1 2.1             | " "           |
| Fair Island              | Europe           | Orkney Is.                         | N. Ocean                 | 59 30 N            | 1 46W             | 10 0          |
| Falmouth                 | Europe           | England                            | Eng. Chan.               | 50 8 N             | 5 2W              | 5 30          |
| False Bay                | Africa           | Caffres.                           | Ind. Ocean               | 34 10 S            | 18 33 E           | 1             |
| Cape False               | Africa           | Caffres<br>Bengal                  | Ind. Ocean               | 34 16 S            | 18 44 E           | ł             |
| False Point              | Asia             | Dengar                             | Ind. Ocean               | 20 22 N            | 87 5 E            | 1             |
| Cape Farewell            | Amer.            | Greenland                          | N. Ocean                 | 59 38 N            | 42 42W            | 1             |
| Cape Farewell            | Asia             | N. Zealand                         | Pacif. Ocean             | 40 37 S            | 172 41 E          | 2 20          |
| Fayal (Town)             | Europe           | Azores                             | Atl. Ocean               | 38 32 N            | 28 41W            | 1 2 20        |

# TABLE I. The Latitudes and Longitudes of Places.

| Names of Places.                          | Cont.            | Country.               | Sea, or Coast.                          | Latitude.          | Longitude.          | High Wet.      |
|---|------------------|------------------------|---|--------------------|---------------------|----------------|
| Fern Island, light house                  | Europe           | England                | Germ. Sea                               | 55°38′N            | 1°44′W              | 3h 30'         |
| Ferro Island, town -                      | Africa           | Canaries               | Atl. Ocean                              | 27 47 N            | 17 46W              | 3 0            |
| Ferrol                                    | Europe           | Spain                  | B. Biscay                               | 43 29 N            | 8 15W               | 30             |
| Fidra                                     | Europe           | Scotland               | Germ. Sea                               | 56 5 N             | 2 51W               | 2 10           |
| Fife's-ness                               | Europe           | Scotland               | Germ. Sea                               | 56 17 N            | 2 37W               | 2 0            |
| Cape Finisterre -                         | Europe           | Spain                  | Atl. Ocean                              | 42 52 N            | 9 17W               | 5 15           |
| Flamborough Head -                        | Europe           | England                | Germ. Ocean<br>Med. Sea                 | 54 11 N<br>43 46 N | 0 19 E              | 3 40           |
| Flores                                    | Europe<br>Europe | Azores                 | Atl. Ocean                              | 39 34 N            | 11 2 E -<br>31 OW   |                |
| Cape Florida                              | Amer.            | Florida                | Atl. Ocean                              | 25 47 N            | 80 95W              | 7 30           |
|   |                  |                        |   |                    |                     |                |
| Flushing                                  | Europe           | Zealand                | Germ. Sea                               | 51 27 N            | 3 83 E              | 0 45           |
| N. Foreland                               | Europe           | England                | Germ. Sea<br>Eng. Chan.                 | 51 25 N            | 1 28 B              | 10 20<br>10 20 |
| S. Koreland<br>Fortaventura, W. point     | Africa           | England<br>Canaries    | Atl. Ocean                              | 51 10 N<br>28 4 N  | 1 23 E<br>14 31W    | 10 20          |
| Fortrose                                  | Europe           | Scotland               | Germ. Sea                               | 57 40 N            | 4 7W                | 11 40          |
| Foul-ness                                 | Europe           | England                | Germ. Sea                               | 52 57 N            | 0 53 E              | 6 45           |
| Foul Point                                | Africa           | Madagascar             | Ind. Ocean                              | 17 40 S            | 49 53 E             | 0 10           |
| Fowey                                     | Europe           | England                | Eng. Chan.                              | 50 20 N            | 4 35W               | 5 40           |
| Isle of France, S.W. point                |                  | Madagascar             | Ind. Ocean                              | 20 27 S            | 57 16 E             |                |
| Cape François -                           | Amer.            | Hispaniola             | Atl. Ocean                              | 19 46 N            | 72 18W              |                |
| Old Cana François                         | Amer             | Hispaniola             | Atl. Ocean                              | 19 40 N            | 70 2W               |                |
| Old Cape François -<br>Cape Frankeklint - | Amer.<br>Europe  | Langeland              | Baltic Sea                              | 55 10 N            | 10 56 E             |                |
| Cape Frehel -                             | Europe           | France                 | Eng. Chan.                              | 48 41 N            | 2 20W               | 6 0            |
| Frejus                                    | Europe           | France                 | Medit. Sea                              | 43 26 N            | 6 44 E              |                |
| Friesland's Peak -                        | Amer.            | Sandw. Land            |   | 59 28              | 26 55W              | 1              |
| Fronsac Straits -                         | Amer.            | Nova Scotia            | Atl. Ocean                              | 45 37 N            | 61 19W              | 8 30           |
| Fuego Island -                            | Africa           | Cape Verd I.           | Atl. Ocean                              | 14 57 N            | 24 28W              |                |
| Funchal                                   | Africa           | Madeira                | Atl. Ocean                              | 32 38 N            | 17 6W               | 0 4            |
| Furneaux Island -                         | Asia             | Society Isles          | Pacif. Ocean                            | 17 11 S            | 143 7W              | 1 1            |
| Furrenas, S. W. pt. Stadt.                | Europe           | Norway                 | N. Ocean                                | 62 6 N             | 5 7 E               | 1. 1           |
| G.  |                  | N C                    | n : : : : : : : : : : : : : : : : : : : |                    | 100 04 7            |                |
| Gabey<br>Mull of Galloway -               | Asia             | New Guinea<br>Scotland | Pacif. Ocean<br>Atl. Ocean              | 0 6 S              | 126 24 E<br>5 9W    |                |
| Galway                                    | Europe<br>Europe | Ireland                | Atl. Ocean                              | 54 38 N<br>53 10 N | 5 9W<br>10 1W       | 11 0           |
| Garmouth                                  | Europe           | Scotland               | Germ. Ocean                             | 57 41 N            | 3 6W                | 11 50          |
| Genoa                                     | Europe           | Italy                  | Medit. Sea                              | 44 25 N            | 8 86 E              | 1 50           |
| St. George's Island -                     | Europe           | Azores                 | Atl. Ocean                              | 38 39 N            | 28 OW               | 1              |
| St. George, town -                        | Amer.            | Bermudas               | Atl. Ocean                              | 92 22 N            | 64 33W              | 5 30           |
| Fort George                               | Europe           | Scotland               | Germ. Sea                               | 57 38 N            | 4 5W                | 11 40          |
| Fort St. George -                         | Asia             | India                  | B. Bengal                               | 13 5 N             | 80 29 E             |                |
| Cape St. George -                         | Asia             | N. Britain             | Pacif. Ocean                            | 4 53 S             | 153 9 E             | i i            |
| Cape George -                             | Amer.            | S. Georgia             | Atl. Ocean                              | 54 17 S            | 36 32W              |                |
| Ghent                                     | Europe           | Flanders               | Scheld                                  | 51 3 N             | 3 44 E              | <b>)</b>       |
| Gibraltar                                 | Europe           | Spain .                | Medit. Sea                              | 36 5 N             | 5 22W               | ) l            |
| Gilbert's Isle                            | Amer.            | Terra del F.           | S. Ocean                                | 55 13 S            | 71 7W               |                |
| Girdleness                                | Europe           | Scotland               | Germ. Sea                               | 57 8 N             | 2 6W                | 0 45           |
| Glasgow                                   | Europe           | Scotland               | R. Clyde                                | 55 52 N            | 4 15W               |                |
| Port Glasgow                              | Europe           | Scotland               | R. Clyde                                | 55 56 N            | 4 38W               | 11 30          |
| Goa                                       | Asia             | India                  | Malabar                                 | 15 SI N            | 73 45 E             | [ [            |
| Goat Island Gomera Island -               | Asia<br>Africa   | China<br>Canarica      | Ind. Ocean                              | 13 55 N            | 120 2 E             | [              |
|   | Africa"          | Canaries               | Atl. Ocean                              | 28 6 N             | 17 8W               |                |
| Cape of Good Hope                         | Africa           | Caffres                | Ind. Ocean                              | 34 29 S            | 18 23 E             | 3 0            |
| Good Hope, town -                         | Africa           | Caffres                | Ind. Ocean                              | 33 56 S            | 18 23 E             | 2 30           |
| Goree Island                              | Europe           | United Prov.           |   | 51 44 N            | 4 20 E              | 1 50           |
| Gorce Island - ~                          | Africa           | Negroland              | Atl. Ocean                              | 14 40 N            | 17 25 E             | 1 30           |
| Gottenburgh Cape Gower                    | Europe<br>Asia   | Sweden<br>China        | Sound<br>Yellow Sea                     | 57 42 N<br>36 52 N | 11 39 E<br>122 36 E | [· ]           |
| Gower's Island -                          | Asia             | N. Britain             | Pacif. Ocean                            | 7 56 S             | 158 56 E            | - 1            |
| Granville                                 | Europe           | France                 | Eng. Chan.                              | 48 50 N            | 1 37W               | 7 0            |
| Gratiosa                                  | Europe           | Azores                 | Atl. Ocean                              | 39 2 N             | 27 58W              |                |
| Gravelines                                | Europe           | _                      | Eng. Chan.                              | 50 59 N            | 2 7 E               | 11-45          |
|   | - 1              |                        | - '                                     | •                  | •                   |                |

TABLE I.
The Latitudes and Longitudes of Places.

| Names of Places.         | Gent.            | Country.               | Sea, or Coast.          | Latitude.          | Longitude.         | HigbWat.     |
|--------------------------|------------------|------------------------|-------------------------|--------------------|--------------------|--------------|
| ravesend                 | Europe           | England                | R. Thames               | 51° 28′N           | 0°20/E             | 1h9C/        |
| reenwich                 | Europe           | England                | R. Thames               | 51 29 N            | 0 0                | 2 40         |
| reenock                  | Europe           | Scotland               | R. Clyde                | 55 57 N            | 4 49W              | 11 30        |
| reigsness                | Europe           | Scotland               | Germ. Sea               | 57 7 N             | 2 6W               | 0 45         |
|                          | Amer.            | Caribbe Is.            | Ati. Ocean              | 15 59 N            | 61 59W             | . 1          |
| uernsey                  | Europe           | England                | Eng. Chan.              | 49 30 N            | 2 52W              | 1 30         |
| uiaquil                  | Amer.            | Peru                   | Pacif. Ocean            | 2 11 S             | 81 11W             | 1 1          |
| lulien-ness              | Europe           | Scotland .             | Germ. Sea               | 56 4 N             | 2 55W              | /2 0         |
| H.                       | P                |                        | N7 O                    |                    |                    | 1,00         |
| Iacluyt's Headland       | Europe           | Greenland              | N. Ocean                | 79 47 N            | 9 11 E             | 1 30         |
| lague                    | Burope           | Unit. Prov.            | Germ. Sea<br>Atl. Ocean | 52 4 N<br>44 46 N  | 4 17 E<br>63 27W   | 8 15<br>7 80 |
| lamburgh -               | Amer.            | Nova Scotia<br>Germany | R. Elbe                 | 58 34 N            | 9-55 E             | 6 0          |
| langcliff -              | Europe<br>Europe | Shetland               | N. Ocean                | 60 9 N             | 0.56W              | 9 30         |
| ape Hang lip -           | Africa           | Caffres                | Ind. Ocean              | 84 16 8            | 18 44 E            | 5 55         |
| Iarlem -                 | Europe           | Unit. Prov.            | Germ. Sea               | 52 22 N            | 4 36 E             | 90           |
| Tartland Point -         | Europe           | England                | Bristol Chan.           | 51 6 N             | 4 40W              | 4 30         |
| Iartlepool               | Europe           | England                | Germ. Sea               | 54 40 N            | 1 1W               | 8 0          |
| <del></del>              |                  |                        |                         |                    |                    |              |
| Iarwich                  | Europe           | England                | Germ. Sea               | 52 11 N            | 1 13 E             | 11 15        |
| ape Hatteras             | Amer.            | Carolina               | Atl Ocean               | 95 12 N            | 76 5W              | 11 0         |
| Lavre de Grace -         | Europe           | France                 | Eng. Chan.              | 49 29 N            | 0 6 E              | 9 20         |
| t. Helena, James town    | Africa.          | Caffres                | Atl. Ocean              | 15 55 S            | 5 49W              | 2 15         |
| ape Henlopen -           | Amer.            | Virginia               | Atl. Ocean              | 38 47 N            | 75 13W             |              |
| ape Henry                | Amer.            | Virginia               | Atl. Ocean              | 36 57 N            | 76-19W             | 11 15        |
| Iervey's Island          | Asia<br>Europe   | Society Isles          | Pacif. Ocean<br>Sound   | 19 17 S            | 158 48W<br>11 43 E | '            |
| Linchingbrooke Island    | Asia             | N. Hebrides            | Pacif. Ocean            | 56 12 N<br>17 25 S | 168 38W            |              |
| lape la Hogue -          | Europe           | France                 | Eng. Chan.              | 49 45 N            | 1 57W              | 9 30         |
|                          |                  |                        |                         |                    | - 5, 77            |              |
| Ioly Head                | Europe           | Wales                  | Irish Sea               | 53 23 N            | 4 45W              | 9 45         |
| Ioly Island, Castle -    | Europe           | England                | Germ. Sea               | 55 41 N            | 1 52W              | 2 80         |
| Iood's Island -          | Asia -           | Marquesas              | Pacif. Ocean            | 9 26 S             | 138 52W            |              |
| cape Horn                | Amer.            | Ter del Fuego          |                         | 55 58 S            | 67 26W             | 1            |
| iout Bay                 | Africa           | Caffres                | Atl. Ocean              | 34 S S             | 18 19 E            | 1            |
| Iowe's Island            | Asia             | Society Isles          | Pacif, Ocean            | 16 46 S            | 154 7W             | ł            |
| Iuahine Island –         | Asia             | Society lales          | Pacif. Ocean            | 16 44 S            | 151 6W             |              |
| Iuli                     | Europe           | England                | R. Humber               | 59 48 N            | 0.33W              | 6 0          |
| L. Humber, entr.         | Europe           | England                | Germ. Ocean             | 53 55 N            | 0 19 E             | 5 15         |
| ackall Island -          | Asia             | China                  | Yellow Sea              | 30 38 N            | 122 45 E           | l            |
| 'ort Jackson -           | Asia             | N. Holland             | Pacif. Ocean            | 33 52 S            | 151 19 E           | 8`15         |
| akutskoi                 | Asia             | Siberia                | Pacif. Ocean            |                    | 129 48 E           |              |
| tio Janeiro              | Amer.            | Brazil                 | Atl. Ocean              | 32 54 S            | 42 44W             | 4 30         |
| ava Head                 | Asia             | Java                   | Ind. Ocean              | 6 49 S             | 105 14 E           |              |
| e Cove                   | Amer.            | N. Main                | Huds. Straits           | 62 20 N            | 69 5W              | 10 0         |
| ersey I. St. Aubins -    | Europe           | England                | Eng. Chan.              | 49 13 N            | 2 12W              | 0 30         |
| t. Ildefonso's Isles -   | Amer.            | Ter.del Fuego          |                         | 55 51 S            | 69 28W             |              |
| nmer Island              | Asia             | N. Hebrides            | Pacif. Ocean            |                    | 169 46 E           |              |
| werkeithing              | Europe           | Scotland               | Germ. Sea               | 56 4 N             | 3 22W              | 2 45         |
| iverness                 | Furance          | Scotland               | Germ. Sea               | 57 36 N            | 4 15W              | 11 50        |
| Danna                    | Africa           | Comora Is.             | Ind. Ocean              | 12 5 S             | 45 40 E            | 11 30        |
| ohn's Island             | Amer.            | S. Carolina            | Atl. Ocean              | 32 40 N            | 78 50W             | 1.           |
| t. John's                | Amer.            | Newfoundi.             | Atl. Ocean              | 47 32 N            | 52 '26W            | 6 0          |
| t. John de Luz -         | Europe           | France                 | B. Biscay               | 43 10 N            | 1 43W              | 3 30         |
| t. Joseph                | Amer.            | California             | Pacif. Ocean            |                    | 109 42W            | 1            |
| raname Island -          | Asia             | N. Hebrides            | Pacif. Ocean            | 19 31 S            | 170 21 E           | 1            |
| ape St. Juan             | Amer,            | Statenland             | Atl. Ocean              | 54 47 S            | 63 47W             |              |
| ort St. Julian -         | Amer.            | Patagonia              | Atl. Ocean              | 49 10 S            | 68 44W             | 4 45         |
| Shoal Isl., just ab. wat | Asia             | China                  | Yellow Sea              | 31 28 N            | 121 30 E           |              |
| t. Ive's Bay             | Europe           | England                | Atl. Ocean              | 50 8 N             | 5 27W              | 50           |
| K.                       | 1                | China                  | Valley Car              | 20 EA ST           | 110 CP             | 1            |
| t. Kilda                 | Asia             | China<br>  Habridea    | Yellow Sez              | 38 59 N<br>57 47 N | 119 6 E<br>8 40W   | 1            |
| inghorn-ness -           | Europe           | Hebrides<br>Scotland   | Atl. Ocean<br>Germ. Sea | 56 6 N             | 3 11W              | 2 30         |
|                          | 1 mu obe         | Locottana              | 1 Germi dea             | 1 40 074           | 1 2 11 11          | 1 200        |

TABLE I.
The Latitudes and Longitudes of Places.

| Numes of Places.              | Cont.           | Gountry.             | Sea, or Goast.           | Latitude.          | Longitude.         | High Wat |
|-------------------------------|-----------------|----------------------|--------------------------|--------------------|--------------------|----------|
| Kinnaird's Head -             | Europe          | Scotland             | Germ. Sea                | 57° 42'N           | 2º 0'W             | 0 0      |
| Kinsale                       | Europe          | Ireland              | Atl. Ocean               | 51 32 N            | 8 <i>5</i> 0W      | 5 15     |
| Cape Koamaroo                 | Asia            | N. Zealand           | Atl. Ocean               | 41 34 S            | 176 30 E           | 9 30     |
| River Kola                    | Europe          | Lapland              | N. Ocean                 | 68 52 N            | 32 59 E            |          |
| Cape Kongsberg -              | Europe          | Moen Isle            | Baltic Sea               | 54 58 N            | 12 31 E            | <b>.</b> |
| Korsor, light-house -         | Europe          | Denmark              | Baltic Sea               | 55:20 N            | 11 8 E             |          |
| Kullen, light-house -         | Europe          | Sweden               | Baltic Sea               | 56 18 N            | 12 27 E            | İ        |
| L.                            | · -             |                      |                          | •                  |                    |          |
| Grand Ladrone -               | Asia            | China                | Chinese Sea              | 22 2 N             | 113 56 E           | <b>,</b> |
| Laguna – –                    | Africa          | I. Teneriff          | Atl. Ocean               | 28 29 N            | 16 18W             | į.       |
| Lancerota                     | Africa          | Canaries             | Atl. Ocean               | 29 14 N            | 13 26W             | 0 45     |
| Land's End                    | Europe          | England              | Eng. Chan.               | 50 6 N             | 5 54W              | 4 30     |
| Landscroon                    | Europe          | Sweden               | Sound                    | 55 52 N            | 12 50 E            | ł        |
| Leghorn                       | Europe          | Italy                | Medit. Sea               | 43 33 N            | 10 16 E            | l        |
| Leith                         | Europe          | Scotland             | Germ. Sea                | 56 ON              | 3 11W              | 2 20     |
| Leper's Island -              | Europe          | N. Hebrides          | Pacif. Ocean             | 15 23 S            | 167 58 E           |          |
| Lerwick                       | Europe          | Shetland I.          | N. Ocean                 | 60 13 N            | 0 55W              | 11 0     |
| T                             | E               | 17                   | n n:                     | 45 1037            | 0.7533             |          |
| Lesparre                      | Europe          | France               | B. Biscay                | 45 19 N            | 0 57W              | 30       |
| Lima                          | Amer.           | Peru<br>Iroland      | Pacif. Ocean             | 12 1 S             | 76 49W             | 4 00     |
| Limerick                      | Europe          | Ireland              | R. Shannon               | 52 22 N            | 9 53W              | 4 30     |
| Lion's Bank                   | Europe<br>'Asia | Ireland<br>China     | Atl. Ocean<br>Yellow Sea | 56 40 N            | 17 45W<br>122 60 E | 1        |
| Lion Island<br>Lisieux        | Europe          | France               |                          | 30 11 N<br>49 11 N | 0 15 E             | l        |
| Lisbon                        | Europe          | Portugal             | Eng. Chan.<br>R. Tagus   | 38 42 N            | 9 10W              | 2 15     |
| Cape Lisburn -                | Asia            | N. Hebrides          | Pacif, Ocean             | 15 41 S            | 166 57 E           | 2 13     |
| Liverpool                     | Europe          | England              | Irish Sea                | 53 24 N            | 3 12W              | 11 15    |
| Lizard                        | Europe          | England              | Eng. Chan.               | 49 57 N            | 5 15W              | 5 30     |
| Zizai u                       | Darope          | 231161111111         | ziig. Chan.              | 15 01 11           | 0 10 11            | 0 00     |
| London                        | Europe          | England              | R. Thames                | 51 31 N            | 0 6W               | 9 0      |
| Loon Loon, Cheer. Is!.        | Asia            | China                | Yellow Sea               | 37 33 N            | 122 50 E           | 1        |
| Cape Lorenzo -                | Amer.           | Peru                 | Atl. Ocean               | 1 28               | 80 17W             |          |
| Port St. Louis -              | Amer.           | Hispaniola           | Atl. Ocean               | 18 19 N            | 73 16W             | ١.       |
| Fort St. Louis -              | Africa          | Isle of France       |                          | 20 10 S            | 57 27 E            | i        |
| Louisburg                     | Amer.           | C. Breton            | B. S. Lawr.              | 45 54 N            | 59 54W             | 7 15     |
| St. Lucia Island -            | Amer,           | Caribbe Isles        | Atl. Ocean               | 13 24 N            | 60 51W             |          |
| Lunden                        | Europe          | Sweden               | Baltic Sea               | 55' 42 N           | 13 21 E            |          |
| Luson                         | Europe          | France               | B. Biscay                | 46 27 N            | 1 11W              | 3 0      |
| <b>M.</b>                     | 1               |                      |                          |                    | l                  |          |
| Macao                         | Asia            | China                | Chin. Sea                | 22 13 N            | 113 46 E           | 5 50     |
| Cape M'Cartney -              | Asia            | China                | Yellow Sea               | 36 50 N            | 122 20 E           | ļ .      |
| Macassar – –                  | Asia            | Celebes              | Pacif. Ocean             | 5 9 S              | 119 49 E           | ł        |
| Madras                        | Asia            | India                | Ind. Ocean               | 13 5 N             | 80 29 E            |          |
| Madre de Dios -               | Asia            | Marquesas            | Pacif. Ocean             | 9 55 S             | 139 9W             | 2 30     |
| Magdalena Island -            | Asia            | Marquesas            | Pacif. Ocean             | 10 25 S            | 138 49W            | 1        |
| Port Mahon -                  | Europe          | Minorca              | Medit. Sea               | 39 51 N            | 3 48 E             | 1        |
| Majorca Island –              | Europe          | Spain                | Medit. Sea               | 39 35 N            | 2 30 E             |          |
| Malacca<br>Mallicola Island - | Asia<br>Asia    | India<br>N. Hebrides | Str. Malacca             | 2 12 N             | 102 5 E            | 1        |
| Manicola Island -             | Total           | 14. Treplides        | Pacif. Ocean             | 16 15 S            | 167 39 E           |          |
| St. Maloes                    | Europe          | France               | Eng. Chan.               | 48 39 N            | 2 2W               | 6 0      |
| Malta Island -                | Europe          | Italy                | Medit. Sea               | 35 54 N            | 14 28 E            | ا ٽ آ    |
| Manilla                       | Asia            | Philippines          | Pacif. Ocean             | 14 36 N            | 120 53 E           | ł        |
| Marigalante Isle -            | Amer.           | Caribbe Isles        | Atl. Ocean               | 15 55 N            | 61 11W             | }        |
| Marseilles                    | Europe          | France               | Medit. Sea               | 43 18 N            | 5 22 E             |          |
| St. Martha                    | Amer.           | Terra Firma          | Atl. Ocean               | 11 27 N            | 74 4W              | ł        |
| St. Martin's Isle -           | Amer.           | Caribbe Isles        | Atl. Ocean               | 18 4 N             | 63 2W              | t        |
| Martinico Island '-           | Amer.           | Wind. Island         | Atl. Ocean               | 14 44 N            | 61 21W             | 1        |
| St. Mary's Isle -             | Europe          | Scilly Is.           | Atl. Ocean               | 49 <i>5</i> 7 N    | 6 43W              | 3 45     |
| St. Mary's Town -             | Europe          | Azores               | Atl. Ocean               | 36 57 N            | 25 9W              | 1        |
| Cape St. Marv -               | Amer.           | Nova Scotia          | Atl. Ocean               | 44 10 N            | 66 12W             | 90       |
| Maskelyne's Isles -           | Asia            | N. Hebrides          | Pacif. Ocean             | 16 32 S            | 167 59 E           |          |
| St. Matthew, lights -         | Europe.         | France               | Atl. Ocean               | 48 20 N            | 4 47W              | 2 50     |
| Maurua Isle                   | Asia .          | Society Isles        | Pacif. Ocean             | 16 26 S            | 152 S3W            |          |
| Cape May                      | Amer.           | Pensilvania          | Atl. Ocean               | 39 4 N             | 74 54W             | . 8 45   |
|                               | •               |                      |                          | J                  | 1                  | ŧ        |

TABLE I.
The Latitudes and Longitudes of Places.

|                          |         | •                 |                         |                    |                 |              |
|--------------------------|---------|-------------------|-------------------------|--------------------|-----------------|--------------|
| Names of Places.         | Cont.   | Country.          | Sea, or Coast.          | Latitude.          | Longitude.      | High Wat     |
| Island of May            | Furana  | Scotland          | Germ. Sea               | 56° 12′N           | 2º36/W          | 2h 0'        |
|                          | 1       | Spitzbergen       | N. Ocean                | 71 10 N            | 9 49W           | 1 2-0        |
| John Mayne's Island -    | Africa  | C. Verd           | Atl. Ocean              | 15 10 N            | 23 5W           | I            |
| Mayo Island<br>Mertow    | 1       | China             | Yellow Sea              | 37 57 N            | 120 38 E        |              |
| Mertow Isles             | Asia    | China             | Yellow Sea              | 38 4 N             | 190 29 E        |              |
| Mewstone -               | Asia    | N. Holland        | Pacif. Ocean            | 43 48 8            | 146 27 B        |              |
| Miatea Island            | 1       | Society Isles     | Pacif. Ocean            | 17 52 8            | 148 6W          |              |
| St. Michael's Island •   | Europe  | Azores            | Atl. Ocean              | 37 47 N            | 95 42W          | l            |
| Milford                  | Europe  | Wales             | St. Geo. Ch.            | 51 45 N            | 5 21W           | 5 1.5        |
| 349 71 3                 | Europe  | Archipela. I.     | 1                       | 36 41 N            | 25 O B          | 1            |
| Molde -                  | Europe  | Norway            | N. Ocean                | 62 44 N            | 7 11 E          | <del>}</del> |
|                          | - Lande |                   |                         |                    |                 |              |
| Cape Montague •          | Amer.   | Sandw. Land       | Atl. Ocean              | 58 33 S            | 26 46W          | ł            |
| Montague Island -        | Asia    | N. Hebrides       | Pacif. Ocean            | 17 26 5            | 168 31 E        | Ī            |
| Montpellier              | Europe  | France            | Medit. Sea              | 43 37 N            | 3 53 E          | ļ.           |
| Monserrate Is. N.E. poin | t Amer. | Caribbe Isles     | Atl. Ocean              | 16 47 N            | 62 17W          | •            |
| Montrose-ness -          | Europe, |                   | Germ. Sea               | 56 42 N            | 2 28W           | 1 30         |
| Monument Isles -         | Asia    | N. Hebrides       | Pacif. Ocean            | 17 14 S            | 168 38 E        | 1            |
| Morlaix                  | Europe  | France            | Eng. Chan.              | 48 S1 N            | 3 55W           | 5 15 -       |
| Morotai, W. point -      | Asia    | Sandwich I.       | Pacif. Ocean            | 21 10 5            | 157 18W         |              |
| Mowee, E. point -        | Asia    | Sandwich I.       | Pacif. Ocean            | 20 50 S            | 155 56W         | , ,          |
| Cape Mulgrave -          | Amer.   | Bhering's St.     | Frozen Oc.              | 67 45 N            | 165 9W          | `            |
| Musketto Cove -          | Amer.   | Greenland         | N. Ocean                | 64 55 N            | 52 57W          | 10 15        |
| Muxara                   | Lurope  | Spain             | Medit. Sea              | 37 4 N             | 1 28W           | l            |
| N                        | 1 -     | 1                 | ļ .                     |                    |                 |              |
| Nangasachi               | Asia    | Japan             | Pacif. Ocean            | 32 32 N            | 128 46 E        | 60           |
| Nankin                   | Asia    | China             | Yellow Sea              | 32 5 N             | 118 46 E        |              |
| Nantes                   | Europe  | France            | R. Loire                | 47 13 N            | 1 34W           | S 45         |
| Naples                   | Europe  | Italy             | Medit. Sea              | 40 51 N            | 14 14 E         | 9 30         |
| Narbonne                 | Europe  | France            | Medit. Sea              | 49 11 N            | 3 0 E           |              |
| Naze                     | Europe  | Norway            | Germ. Sea               | 57 58 N            | 7 3 E           | 11 15        |
| Newburgh                 | Europe  | Scotland          | Germ. Sea               | 57 20 N            | 2 2W            | 0 30         |
| Newcastle                | Europe  | England           | R. Tyne                 | 55 3 N             | 1 30W           | 3 15         |
| New Year's Harbour       | Amer.   | Staten Land       | Atl. Ocean              | 54 49 S            | 64 11W          |              |
| Cape Newenhan -          | Amer.   | N. W. Coast       | Pacif. Ocean            | 58 42 N            | 162 21W         | 00.          |
| Nice                     | Europe  | France            | Medit. Sea              | 43 42 N            | 7 17 E          |              |
| St. Nicholas Mole -      | Amer.   | Hispaniola        | Atl. Ocean              | 19 49 N            | 73 30W          |              |
| Nieuport                 | Europe  | Flanders          | Germ. Sea               | 51 8 N             | 2 45 E          | 0 0          |
| Nhgpo, or Liampo -       | Asia    | China             | Yellow Sea              | 29 58 N            | 120 18 E        |              |
| Cape Noir                | Amer.   | Ter del Fuego     |                         | 54 82 S            | 73 3W           |              |
| Nootka                   | Amer.   | N. W. Coast       | Pacif. Ocean            | 49 36 N            | 126 43W         | 0 20         |
| Nore                     | Europe  | England           | Germ. Sea               | 51 28 N            | 0 46 E          | 0 0          |
| Norfolk Island -         | Asia    | N. Holland        | Pacif. Ocean            | 29 25              | 168 10 E        | 10           |
| North Cape               | Eurepe  | Lapland           | N. Ocean                | 71 10 N            | 25 57 E         | 3 O          |
| Cape North               | Amer.   | S. Georgia        | Atl. Ocean              | 54 5 S             | 33 15W          |              |
| Norton's Sound -         | Amer.   | N. W. Coast       | Frozen Oc.              | 64 30 N            | 162 49W         |              |
| Noss Head                | Europe  | Scotland          | Germ. Sea               | 58 29 N            | 3 8W            | 9 15         |
| 0.                       |         |                   |                         |                    |                 | -            |
| Oaitipeha Bay            | Asia    | Otaheite          | Pacif. Ocean            |                    | 149 14W         |              |
| Ohamaneno Harbour        | Asia    | Uliateah          | Pacif. Ocean            |                    | 151 38W         | 11 20        |
| Ohevahoa Island •        | Asia    | Society Isles     | Pacif. Ocean            | 9 41 S             | 139 2W          |              |
| Ohitahoo Island -        | Asia    | Society Isles     | Pacif Ocean             | 9 55 S             | 139 6W          | 2 80         |
| Ohierk -                 | Asia    | Kamschatka        | Sea of Okotsk           |                    | 143 12 E        |              |
| Old Head                 | Europe  | Orkney Isles      |                         | 58 45 N            | 3 1W            | 11 80        |
| Oleron Island -          | Europe  | France            | B. Biscay               | 46 3 N             | 1 25W           | 3 0          |
| Olinde                   | Amer.   | Brazil            | Atl. Ocean              | 8 13 S             | 35 5W           | , -          |
| Ollone, Sands of         | Europe  | France            | B. Biscay               | 46 SO N            | 1 48W           | <b>3</b> 0   |
| St. Omer's               | Europe  | Flanders          | Eng. Chan.              | 50 40 N            | 15 E            |              |
| Onateayo Island -        | Asia    | Society Isles     | Pacif. Ocean            |                    | 158 51W         | •            |
| Onecheow                 | Asia    | Sandwich I.       | Pacifi Ocean            | 21 49 N            | 160 14W         |              |
| Onalashka Island -       | Amer.   | N. W. Coast       | Pacif. Ocean            | 53 55 N            | 166 30W         |              |
| Oporto                   | Europe  | Portugal          | Atl. Ocean              | 41 10 N            | 8 27W           | 3 15         |
| Orbitello                | Europe  | Italy<br>Scotland | Medit. Sea<br>Germ. Sea | 42 32 N<br>58 10 N | 12 7 E<br>3 36W | 10 0         |
|                          | Europe  | SCOCIAIRA         | Cerm. Sea               | 20 10 14           | 3 30 11         | - 3.3TV      |
|                          |         |                   |                         |                    |                 |              |

TABLE I.
The Latitudes and Longitudes of Places.

|  |   |  | · · · · · · · · · · · · · · · · · · ·                             |  |  |               |
|--|---|--|---|--|--|---------------|
| Names of Places.   | Cont.                                       | Country.   | Sea, or Coast.  | Latitude.  | Longitude.                                     | High Wat.     |
| Orfordness<br>L'Orient<br>New Orleans  | Europe<br>Europe<br>Amer.                   | England<br>France<br>Louisiana                           | Germ. Sea<br>B. of Biscay<br>R. Mississipi                        | 52°13′N<br>47 45 N<br>29 58 N                      | 1° 85′ E<br>3 22W<br>89 59W                    | 9 45<br>3 O   |
| Oroolong Island Orotava Cape Or egal   | Asia<br>Africa<br>Europe                    | Pelew Isles<br>Teneriffe<br>Spain                        | Pacif. Ocean<br>Atl. Ocean<br>Atl. Ocean                          | 7 18 8<br>28 29 N<br>43 46 N                       | 194 49 E<br>16 24W<br>7 39W                    | 8 O<br>8 O    |
| Osnaburg Island Ostend Owharre Bay Owharhes S. extremity                               | Asia<br>Europe<br>Asia                      | Society Isles Flanders Huahine I.                        | Pacif. Ocean<br>Germ. Sea<br>Pacif. Ocean                         | 17 52 S<br>51 14 N<br>16 43 S<br>18 54 N           | 148 6W<br>2 56 E<br>151 10W<br>155 45W         | 0 0           |
| N. extremity P.  | Asia  | Sandwich I.  | Pacif Ocean   | 20 17 N<br>15 38 S                                 | 155 58W  |               |
| Palliser's Isles Cape Palliser Palma Island Palmerston's Island                        | Asia<br>Asia<br>Africa<br>Asia              | Society Isles N. Zealand Canaries Society Isles          | Pacif. Ocean<br>Pacif. Ocean<br>Atl. Ocean<br>Pacif. Ocean        | 41 38 S<br>28 37 N<br>18 0 S                       | 175 23 E<br>17 50W<br>162 57W                  |               |
| Panama<br>Paoom Island<br>Paris  | Amer.<br>Asia<br>Europe                     | Mexico<br>N. Hebrides<br>France                          | Pacif. Ocean<br>Pacif. Ocean<br>R. Seine                          | 8 48 N<br>16 30 S<br>48 50 N                       | 80 21W<br>168 29 E<br>2 19 E                   | 8 0           |
| Patrixford St. Paul's Island - St. Paul de Leon -                                      | Europe<br>Africa<br>Europe                  | Iceland<br>Madagascar<br>France                          | N. Ocean<br>Ind. Ocean<br>Eng. Chan.                              | 65 86 N<br>87 51 S<br>48 41 N                      | 24 10W<br>77 48 E<br>4 0W                      | 4 0           |
| Pedro Blanco - Cape Pembroke - Pentbnd Skerries - Perpignan -                          | Asia<br>Amer.<br>Europe                     | China<br>New Wales<br>Scotland<br>France                 | Yellow Sea<br>Hudson's Bay<br>N. Ocean<br>Medit. Sea              | 22 19 N<br>62 57 N<br>58 42 N<br>42 42 N           | 116 18 E<br>82 1W<br>8 1W<br>2 54 E            | 0 0<br>10 50  |
| St. Peter's Fort St. Peter's Island Peterhead -  | Amer. Amer. Europe                          | Martinico<br>Newfoundl<br>Scotland                       | Atl. Ocean<br>Atl. Ocean<br>Germ. Sea                             | 14 44 N<br>46 46 N<br>57 32 N                      | 61 21W<br>56 17W<br>1 46W                      | 0 0           |
| Petersburg Petit Goave Petropawloskoi -  | Europe ·<br>Amer.<br>Asia                   | Russia<br>Hispaniola<br>Kamschatka                       | Baltic Sea<br>Atl. Ocean<br>G.of Awatska                          | 59 56 N<br>18 27 N<br>58 1 N                       | 30 19 E<br>72 52W<br>158 35 E                  |               |
| Philadelphia<br>St. Philip's Fort -<br>Pickersgill's Harbour<br>Pickersgill's Island - | Amer.<br>Europe<br>Asia<br>Amer.            | Pensylvania<br>Minorca<br>N. Zealand<br>S. Georgia       | R. Delaware<br>Medit. Sea<br>Pacif. Ocean<br>Atl. Ocean           | 39 57 N<br>39 51 N<br>45 47 S<br>54 42 S           | 75 13W<br>3 48 E<br>166 18 E<br>36 58W         | `             |
| Pico Fort du Pillier - Isle of Pines   | Europe<br>Europe<br>Asia                    | Azores<br>France<br>N. Caledonia                         | Atl. Ocean<br>B. of Biscay<br>Pacif. Ocean                        | 38 29 N<br>47 2 N<br>22 38 S                       | 28 26W<br>2 22W<br>167 38 E                    | 3 0           |
| Pitcairn's Island Plymouth Pondicherry   | Amer.<br>Europe<br>Asia                     | Chili<br>England<br>India                                | Pacif. Ocean<br>Eng. Chan.<br>B. Bengal                           | 25 22 S<br>50 22 N<br>11 42 N                      | 133 22W<br>4 16W<br>79 53 E                    | 6 0           |
| Port Clasgow - Portland Portland Island - Portland Island - Porto Bello                | Europe<br>Europe<br>Europe<br>Asia<br>Amer. | Scotland<br>England<br>Norway<br>N. Zealand<br>New Spain | R. Clyde<br>Eng. Chan.<br>North Sea<br>Pacif. Ocean<br>Carib. Sea | 55 56 N<br>50 31 N<br>63 22 N<br>39 25 S<br>9 33 N | 4 98W<br>2 96W<br>18 54W<br>178 12 E<br>79 50W | 11 90<br>7 90 |
| Porto Sancto Port Royal Port Royal Port Paix   | Africa<br>Amer.<br>Amer.<br>Amer.           | Canaries Jamaica Martinico Hispaniola                    | Atl. Ocean<br>Atl. Ocean<br>Atl. Ocean<br>Atl. Ocean              | 32 58 N<br>18 0 N<br>14 36 N<br>19 58 N            | 16 25W<br>76 45W<br>61 9W<br>73 2W             |               |
| Port Praya   | Asia<br>Africa                              | N. Ireland<br>St. Jago                                   | Pacif. Ocean Atl. Ocean   |  | 153 5 E<br>23 29W                              | 11 0          |
| Portsmouth Prince of Wales Fort - Providence   | Europe<br>Amer.<br>Amer.                    | England<br>New Wales<br>N. England                       | Eng. Chan.<br>Hudson's Bay<br>Atl. Ocean                          | 50 47 N<br>58 48 N<br>41 51 N                      | 1 6W<br>94 7W<br>71 26W                        | 11 15         |
| Pudyoua Pulo Condor Island Pulo Timon Island Pylestaget's Island                       | Asia<br>Asia<br>Asia<br>Asia                | N. Caledonia Cambaya Gulf of Siam Friendly Isles         | Pacif. Ocean<br>Ind. Ocean<br>Ind. Ocean<br>Pacif. Ocean          | 20 18 S<br>8 40 N<br>3 0 N<br>22 23 S              | 164 41 E<br>107 20 E<br>104 25 E<br>175 41W    | 6 30          |
|  |   |  |   |  | <u>'</u>                                       |               |

TABLE I.
The Latitudes and Longitudes of Places.

| Names of Places.          |     | Cont.            | Country.                | Sea, or Coast.           | Latitude.          | Longitude.                            | HighWat          |
|---------------------------|-----|------------------|-------------------------|--------------------------|--------------------|---------------------------------------|------------------|
| Q.                        |     |                  |                         |                          |                    | · · · · · · · · · · · · · · · · · · · |                  |
| Quebec -                  | _   | Amer.            | Canada                  | R. St. Lawr,             | 46° 55′N           | 69°53′W                               | 7h 30'           |
| Quimper -                 | _   | Europe           | France                  | B. of Biscay             | 47 58 N            | 4 7W                                  | 2 30             |
| Cape Quiros -             |     | Asia             | N. Hebrides             | Pacif. Ocean             | 14 56 S            | 167 20 E                              | 3 0              |
| Quite -                   |     | Amer.            | Peru                    | Pacif. Ocean             | 0 13 8             | 77 55W                                | 1 3 0            |
| R.                        |     |                  |                         | - acm occum              | 0.00               | 1 55                                  | 1                |
| Ramhead -                 | -   | Europe           | England                 | Fng. Chan.               | 50 19 N            | 4 20W                                 | 6 0              |
| Ramsay -                  | -   | Europe           | lsle of Man             | Irish Sea                | 54 17 N            | 4 26W                                 | 10 30            |
| Ramsgate -                | _   | Europe           | England                 | Germ. Sea                | 51 20 N            | 1 25 E                                | 10 30            |
| Ratry-head -              | -   | Europe           | Scotland                | Germ. Sea                | 57 38 N            | 1 49W                                 | 0 0              |
| Ravenna -                 | _   | Europe           | Italy                   | Adriatic Sea             | 44 25 N            | 12 10 E                               | 1 0 0            |
| Recif -                   | _   | Amer.            | Brazil                  | Atl. Ocean               | 8 10 S             | 35 35W                                | <del> </del> - , |
| Redhead -                 | -   | Europe           | Scotland                | Germ. Sea                | 56 37 N            | 2 31W                                 | 1 40             |
| Cape Reikianess           | -   | Europe           | Iceland                 | N. Ocean                 | 63 55 N            | 22 47W                                | 1 1              |
| Resolution Bay            | _   | Asia             | Ohitahoo                | Pacif. Ocean             | 9 55 S             | 139 9W                                | 2 30             |
| Cape Resolution           |     | Amer.            | N. Main                 | Hudson's St.             | 61 29 N            | 65 15W                                | 7 0              |
|                           |     |                  |                         |                          |                    |                                       |                  |
| Resolution Island         | -   | Asia             | Society Isles           | Pacif. Ocean             | 17 23 S            | 141 45W                               | l                |
| Port Resolution           | -   | Asia             | Tanna I.                | Pacif. Ocean             | 19 32 S            | 169 41 E                              | ]                |
| Rhe Island -              | -   | Europe           | France                  | B. of Biscay             | 46 15 N            | 1 35W                                 | 3 15             |
| Rhode Island -            | -   | Amer.            | New Engl.               | Atl. Ocean               | 41 28 N            | 71 30W                                | 8 15             |
| Riga                      | -   | Eurôpe           | Livonia                 | Baltic Sea               | 57 5 N             | 25 5 E                                | 1                |
| Rimini -                  | -   | Europe           | Italy                   | Mediter. Sea             | 44 4 N             | 12 34 E                               | 1                |
| Rio Janeiro -             | -   | Amer,            | Brazil                  | Atl. Ocean               | 22 54 S            | 42 44W                                |                  |
| Robin Hood's Bay          | -   | Europe           | England                 | Germ. Sea                | 54 25 N            | 0 13W                                 | 3 0              |
| Rochelle -                | -   | Europe           | France                  | B. of Biscay             | 46 9 N             | 1 10W                                 | 8 45             |
| Rochester -               | -   | Europe           | England                 | Germ. Sea                | 51 26 N            | 0 30 E                                | 0.45             |
| D. I.C.                   |     |                  |                         | D CD:                    |                    |                                       |                  |
| Rochfort -                | -   | Europe           | France                  | B. of Biscay             | 45, 56 N           | 0 59W                                 | 4 15             |
| Rock of Zubory            | . • | Europe           | Portugal                | Atl. Ocean               | 38 45 N            | 9 35W                                 | 3 0              |
| Rodrigues, Island         | · - | Africa           | Madagascar              | Ind. Ocean               | 19 41 S            | 63 10 E                               |                  |
| Rome                      | •   | Europe           | Italy                   | Mediter. Sea             | 41 54 N            | 12 29 E                               |                  |
| Ronaldsha -<br>Rothesay - | -   | Europe           | Scotland                | Orkney Isles             | 59 22 N            | 2 35W                                 | 10 30            |
| Rotterdam -               | -   | Europe           | Scotland<br>Unit. Prov. | Atl. Ocean<br>Germ. Sea  | 55 50 N<br>51 56 N | . 5 17W                               | 11 0             |
| Rotterdam Island          | -   | Europe<br>Asia   | Friendly Isles          |                          | 20 16 S            | 4 28 E                                | 3 40             |
| Rouen -                   |     | Europe           | France                  | Eng. Chan.               | 49 27 N            | 1 .5W                                 | 1 15             |
| Cape Roxo -               | -   | Africa           | Guinea                  | Atl. Ocean               | 11 47 N            | 16 55W.                               | • 15             |
| Rye -                     | -   | Europe           | England                 | Germ. Sea                | 50 55 N            | 0 44 E                                | 11 15            |
| S.                        |     | •                | • .                     |                          |                    |                                       |                  |
| Saba Island -             | •   | Amer.            | Caribbe Is.             | Atl. Ocean               | 17 39 N            | 63 17W                                | ſ                |
| Cape Sable -              | -   | Amer.            | Nova Scotia             | Atl. Ocean               | 43 24 N            | 65 39W                                | 8 15             |
| Saintes -                 | . • | Europe           | France                  | B. of Piscay             | 45 45 N            | 0 39W                                 | . 9 0            |
| Salem                     | -   | Amer.            | Unit. States            | Atl. Ocean               | 42 34 N            | 70 55W                                | :                |
| Salisbury Island          | -   | Amer.            | N. Main                 | Hudson's St.             | 63 29 N            | 76 48W                                | 11 Q             |
| Sall Island -             |     | Africa           | Cape Verd               | Atl. Ocean               | 16 38 N            | 22 56W                                | · .              |
| Sallee                    | •   | Africa           | Morocco                 | Atl. Ocean               | 94 10 N            | 6 43W                                 | l                |
| Salonique -               | -   | Europe           | Turkey                  | Archipelago              | 40 41 N            | 23 8 E                                | ۱.               |
| Salvages Islands          | -   | Africa           | Canaries                | Arl. Ocean               | 30 ON              | 15 54W                                |                  |
| Samana -                  | -   | Amer.            | Hispaniola              | Atl. Ocean               | 19 15 N            | 69 16W                                |                  |
| Cape Samborough           | -   | Amer.            | Nova Scotia             | Atl. Ocean               | 44 93 N            | 63 32W                                | 8 0              |
| Sancto Cruz -             | •   | Africa           | Teneriffe               | Atl. Ocean               | 28 27 N            | 16 16W                                |                  |
| Sandwich -                | _   | Furance          | England                 | Fng Chan                 | 51 10 N            | 1 100                                 | 11.00            |
| Sandwich Bay              | -   | Europe<br>Anier. | England<br>S. Georgia   | Eng. Chan.<br>Atl. Ocean | 51 19 N<br>54 42 S | 1 15 E<br>36 12W                      | 11 30            |
| Cape Sandwich             | -   | Asia             | Malicola                | Pacif. Ocean             | 16 28 S            | 167 59 E                              | 1                |
| Sandwich Harbour          | -   | Asia             | Mallicola               | Pacif. Ocean             | 16 25 S            | 167 53 E                              | 1                |
| Sandwich Island           | -   | Asia             | N. Hebrides             | Pacif. Ocean             | 17 41 S            | 168 33 E                              |                  |
| Sandy Cape -              | _   | Asia             | N. Holland              | Pacif. Ocean             | 24 45 S            | 153 9 E                               | •                |
| Cape Saunders             | -   | Amer.            | Sandwich L.             | Atl. Ocean               | 54 6 S             | 36 57W                                |                  |
| Saunder's Island          | _   | Amer.            | S. Georgia              | Atl. Ocean               | 58 OS              | 26 58W                                | ]                |
| Savage Island -           | -   | Asia :           | N. Hebrides             | Pacif. Ocean             | 19 2 S             | 169 SOW                               |                  |
| Scarborough -             | _   | Europe           | England                 | Germ. Sea                | 54 21 N            | 0 18W                                 | 3 45             |
| Scaw light -              | -   | Europe           | Jutland                 | Sound                    | 57 44 N            | 10 37 E                               | 1                |
| Schelling leland -        | -   | Europe           |                         |                          | 53 17 N            |                                       | ,                |
|                           |     | -                | •                       | •                        |                    | •                                     | •                |

TABLE I.
The Latitudes and Longitudes of Places.

| Names of Places.           | Cont.    | Gountry.       | Sea, or Coast. | Latitude. | Longitude. | HighWat. |
|----------------------------|----------|----------------|----------------|-----------|------------|----------|
| Seal Island                | Amer.    | New England    | Atl. Ocean     | 43°26′N   | 65° 56′W   | 8h45'    |
| Cape St. Sebastian -       | Africa   | Madagascar     | Ind. Ocean     | 12 30 S   | 46 25 E    |          |
| Senegal                    | Africa   | Negroland      | Atl. Ocean     | 15 53 N   | 16 21W     | 10 30    |
| Seychelles Island -        | Asia     | India          | Ind. Ocean     | 4 37 S    | 55 35 E    | 5 30     |
| Seyne River, entr          | Europe   | France         | Eng. Chan.     | 49 36 N   | 0 30 E     | 9 0      |
| Shepherd's Isles -         | Asia     | N. Hebrides    | Pacif. Ocean   | 16 58 N   | 168 42 E   | 1 1      |
| Siam                       | Asia     | India          | Bay of Siam    | 14 18 N   | 100 50 E   |          |
| Simen's Bay                | Africa   | Caffres        | Atl. Ocean     | 34 10 S   | 18 22 E    | 3 30     |
| Sligo                      | Europe . | Ireland        | Atl. Ocean     | 54 15 N   | 8 49W      | 5 30     |
| Siyne Head                 | Europe   | Ireland        | Atl. Ocean     | 53 20 N   | 10 45W     | 7 0      |
| Smyrna                     | Asia     | Natolia        | Medit, Sea     | 38 28 N   | 27 20 E    |          |
| Mount Snæsell -            | Europe   | Iceland        | N. Ocean       | 64 52 N   | 23 54W     | 1        |
| Sombavera Isles -          | Amer.    | West Indies    | Carib. Sea     | 18 38 N   | 63 37W     |          |
| River Somme                | Europe   | France         | Eng. Chan.     | 50 18 N   | 1 35 E     | 11 10    |
| Sooloo                     | Asia     | India          | Ind. Ocean     | 5 57 N    | 121 15 E   |          |
| Southampton                | Europe   | England        | Eng. Chan.     | 50 55 N   | 1 5W       | 00       |
| Cape South                 | Asia     | N. Zealand     | Atl. Ocean     | 47 19 S   | 167 8 E    | 1 1      |
| Southern Thule             | Amer.    | Sandw. Land    | Atl. Ocean     | 59 34 S   | 27 45W     | 1 !      |
| Cape Spartel               | Africa . | Barbary        | Atl. Ocean     | 35 49 N   | 5 54W      | 3 0      |
| Speaker Bank               | Asia     | India          | Ind. Ocean     | 4 45 S    | 72 57 E    | 1        |
| Sproe Island               | Europe   | Denmark        | Belt           | 55 20 N   | 10 58 E    | F 00     |
| Spurn                      | Europe   | England        | Germ, Sea      | 53 41 N   | 0 17 E     | 5 20     |
| Staalet, N. pointStadeland |          | Norway         | N. Ocean       | 62 13 N   | 5 11 E     |          |
| Staples, lights            | Europe   | England        | Germ. Sea      | 55 39 N   | 1 42W      | 3 0      |
| Start point                | Europe   | England        | Eng. Chan.     | 50 9 N    | 3 51W      | 6 45     |
| Stockholm                  | Europe   | Sweden         | G. of Bothnia  |           | 18 4 E     |          |
| Stockton                   | Europe   | England        | Germ. Sea      | 54 41 N   | 1 9W       | 3 50     |
| Stonehaven                 | Europe   | Scotland       | Germ. Sca      | 56 58 N   | 2 14W      | 10       |
| Strangford Bay -           | Europe   | Ircland        | Atl. Ocean     | 54 21 N   | 5 50W      | 10 30    |
| Straumness                 | Europe   | Iceland        | N. Ocean       | 65 40 N   | 24 29W     | 1        |
| Success Bay                | Amer.    | Ter.del Fuego  |                | 54 50 S   | 65 25W     | 4 30     |
| Success Cape               | Amer.    | Ter.del Fuego  |                | 55 1 S    | €5 27W     | 4 30     |
| Sunborough Head -          | Europe   | Shetland Is.   | N. Ocean       | 59 52 N   | 1 19W      | 4 0      |
| Surat                      | Asia     | India          | Ind. Ocean     | 21 10 N   | 72 29 E    | !        |
| Swansea T.                 | Europe   | Wales          | Bristol Chap.  | 51 40 N   | 4 30W      | 60       |
| Table Island               | Asia     | N. Hebrides    | Pacif. Ocean   | 15 58 S   | 167 7 E    | 1 8      |
| Tamarind's Bay -           | Africa   | Isle of France |                | 20 19 \$  | 57 20 E    |          |
| Tamarin Town -             | Africa   | I. Socotra     | ind. Ocean     | 12 30 N   | -53 9 E    | 9 0      |
| Tanna                      | Asia     | N. Hebrides    | Pacif. Ocean   | 19 32 S   | 169 41 E   | 5 0      |
| Taoukaa Island -           | Asia     | Society files  | Pacif. Ocean   | 14 30 S   | 145 9W     | 1 1      |
| Tarascon                   | Europe   | France         | Medit. Sea     | 43 48 N   | 4 40 E     | 1 1      |
| Tarbet                     | Europe   | Scotland       | Locking        | 55 52 N   | 5 20W      | 11 0     |
| Tarbet-ness                | Europe   | Scotland       | Germ. Sea      | 57 54 N   | 3 48W      | 11 30    |
| Tassacorta                 | Africa   | I. Palma       | Atl. Ocean     | 28 38 N   | 17 58W     |          |
| Tay Bar                    | Europe   | Scotland       | Germ. Eça      | E6 27 N   | 2 42W      | 2 0      |
| Tees' Mouth                | Europe   | England        | Germ. Sea      | 54 S6 N   | 0 57W      | 3 0      |
| Temontengis                | Asia     | Scoloo Is.     | Pacif. Ocean   | 5 57 N    | 120 .53 E  | 1 1      |
| City of Ten he Fia         | Asia     | China          | Yellow Sea.    | 37 46 N   | 120 36 E   | 1        |
| Teneriffe, Peak            | Africa   | Canaries       | Atl, Ocean     | 28 13 N   | 16 29W     | 3 0      |
| Tercera Isles              | Europe   | Azores         | Atl. Ocean     | 38 45 N   | 27 6W      | ا ا      |
| River Thames, mouth        | Europe   | England        | Germ. Sea      | 51 28 N   | 1 5 E      | 1 30     |
|                            | Amer.    | Virgin Isles   | Atl. Ocean     | 18 22 N   | 64 51W     | 1        |
| Cape Tiburon -             | Amer.    | St. Domingo    | Atl. Ocean     | 18 17 N   | 74 31W     |          |
| Cape Tienez                | Africa   | Earbary        | Medit. Sea     | 36 32 N   | - 1 19 E   |          |
| Tion Lien                  | Asia     | China '        | Yellow Sea     |           | 117 38 E   |          |
| Timor, S. W. point -       | Asia     | India          | Ind. Gcean     | 10 23 S   | 128 59 E   | 1 1      |
| Timor Land, S. point       | Asia     | India          | Ind. Ocean     | 8 15 S    | 131 54 E   |          |
| Tinmouth                   | Europe   | England        | Germ. Sea      | 55 S N    | 1 2×W      | 8 0      |
| Tobermory -                | Europe   | Scotland       | Atl. Ocean     | 56 37 N   | 6 11W      | 5 30     |
| Tod Head                   | Europe   | Scotland       | Germ. Sea      | 56 52 N   | 2 17W      | 1 90     |
|                            |          |                |                |           | l          | 1        |

TABLE I.
The Latitudes and Longitudes of Places.

| Tolaga Bay   |                    |     |          |               |                |           |            |         |
|--|--------------------|-----|----------|---------------|----------------|-----------|------------|---------|
| Torbay   | Names of Places.   |     | Cont.    | Country.      | Sea, or Coast. | Latitude. | Longitude. | HighWat |
| Torbay   | Tulana Para        |     | 2 sie    | N. Zasland    | Paris Ocean    | 00001/2   | 1700 24/E  | 6.0     |
| Torbay   |                    | ٠ ا |          |               |                |           |            | 60      |
| Tornea   |                    | -   |          |               |                |           |            |         |
| Cape Trefalgar   |                    |     |          |               |                |           |            | 6 15    |
| Toulon   |                    |     |          |               |                |           |            | l       |
| Toward Point   |                    | - 1 |          |               |                |           |            | l       |
| Traitor's Head   |                    | -   | Europe   |               |                |           |            | 1       |
| Cape Trefalgar   | Toward Point -     | - 1 | Europe   | Scotland      | Atl. Ocean     | 55 52 N   | 5 58W      | 8 30    |
| Cape Trefalgar   Cape   Cape | Traitor's Head     | -   | Asia     | Erramanga     | Pacif. Ocean   | 18 43 S   | 169 20 E   | ł       |
| Triguier   |                    | -   |          |               |                |           |            |         |
| Triguier   | Cape Trefalgar     | -   | Europe   | Spain         | Atl. Ocean     | 36 10 N   | 6 1W       |         |
| Trinomale  |                    | -   |          |               | Eng. Chan.     | 48 47 N   | 3 14W      | 5 30    |
| Tripoli  |                    | -   |          |               |                | 8 32 S    |            | ł       |
| Troup Head   |                    |     | Africa   |               | Medit. Sea     |           |            | 1       |
| Cape Turnagain   |                    |     |          |               |                |           | 2 17W      | 0 0     |
| Turtle Island  |                    |     |          |               |                |           |            | •       |
| Typa Road  |                    |     |          |               |                |           |            | i       |
| Uliateah   | 1                  |     |          |               |                |           | I          | ł       |
| Ulisteah   |                    | .   |          |               | Canada Sea     | -2 514    | 1          | l       |
| Uraniberg   -   Europe   Valparaiso   -     Europe   Europe   Van Dieman's Head   -     Amer.   Van Dieman's Head   -  |                    | _   | Asia     | Society Teles | Pacif Ocean    | 16 45 5   | 151 91317  | Ì       |
| Ushant, lights   |                    |     |          |               |                |           |            | 1       |
| Ushant, lights   |                    |     |          | l — •         |                |           |            | }       |
| St. Valery   |                    | -   |          | ·             |                |           |            |         |
| St. Vallery  | Usnant, lights     | -   | Lurope   | rrance '      | rng. Chan.     | 48 28 N   | 5 4W       | 4 30    |
| St. Vallery  | V,                 |     | l_       | l_            | - ~:           |           | 1          |         |
| Van Pieman's Head  |                    | -   |          |               |                |           |            |         |
| Vannes   | St. Vallery -      | -   | Europe   | France        | Eng. Chan.     | 49 52 N   | 0 41 E     | 10 0    |
| Vannes   | Valparaiso -       | -   | Amer.    | Chili         | Pacif. Ocean   | 33 3 S    | 72 19W     | l       |
| Vence  | Van Dieman's Head  | -   | Asia     | Tongatabu     | Pacif. Ocean   | 21 4 S    | 174 56W    | 1       |
| Verice   | Vannes -           | -   | Europe   | France        | B. Biscay      | 47 39 N   | 2 46W      | 3 45    |
| Verice   | Vence              | -   | Europe   | France        | Medit. Sea     | 43 43 N   | 7 7 E      |         |
| Verus Point   Asia   Otaheite   Pacif. Ocean   17 29 S   149 36W   10 58   |                    | -   |          |               | Medit. Sea     | 45 26 N   | 12 4 E     | 90      |
| Vera Cruz  | Venus Point -      | -   |          |               | Pacif. Ocean   | 17 29 S   | 149 36W    | 1 .     |
| Cape Verd  |                    |     |          |               | -              |           |            |         |
| Cape Verd  | Vera Cruz          |     | Amer.    | New Spain     | G. Mexico      | 19 12 N   | 97 30W     | 1       |
| Vigo   |                    | _   |          |               |                |           |            | t       |
| Villefranche   |                    |     | <b>1</b> |               |                |           |            | 9 15    |
| Cape St. Vincent   Cape Virgin   Cape Walsingham   Cape Walsingham   Cape Walsingham   Cape Walsingham   Cape Walsingham   Cape Walsingham   Cape West Indies   Cape Walsingham   Cape Walsingham   Cape West Indies   Cape Walsingham   Cape Walsingham   Cape Walsingham   Cape West Indies   Cape Walsingham   Ca |                    |     | 1 *      |               | l              |           |            | . 0 -0  |
| Cape Virgin  |                    |     |          |               |                |           |            | 9.0     |
| Virgin Gorda, Fort   |                    | •   |          |               | 1              | I         |            | 1       |
| Prince of Wales' Fort   Cape Walsingham   Amer.   Wardhus   -   Europe   Europe   Weymouth   -   Europe   Europe   England   Irish Sea   54 25 N   3 23W   11 15   Whitsuntide Island   -   Asia   Woahoo Island   -   Asia   Woahoo Island   -   Amer.   Amer.   York Fort   -   Amer.   Amer.   Amer.   York Fort   -   Amer.   Amer.   Amer.   York Sort   -   Amer.   Amer.   Amer.   York Sort   -   Amer.   Amer.   Amer.   Amer.   Amer.   Youghall   -   Europe   Europe   England   Irish Sea   54 25 N   3 23W   11 15   Irish Sea   54 25 N   3 23W   11 15   Irish Sea   Seorgia   Asia   Asia   Bengal   Irish Sea   54 25 N   3 23W   11 15   Irish Sea   Seorgia   Arl. Ocean   15 44 S   168 20 E   Hughly R.   22 35 N   88 29 E   Arl. Ocean   21 45 N   157 51W   Irish Sea   Iri |                    |     |          |               |                |           |            | 100     |
| Prince of Wales' Fort   Cape Walsingham   - Amer.   Amer.   Amer.   Cape Walsingham   - Europe   Europe   Lapland   Leand   N. Ocean   63 20 N   20 28W   Fort   Cape Whitby   Europe   Europe   England   Eng. Chan.   50 37 N   2 35W   3 20   Mitchaven   - Europe   England   Eng. Chan.   50 37 N   2 35W   3 20   Mitchaven   - Europe   England   Eng. Chan.   50 37 N   2 35W   3 20   Mitchaven   - Europe   England   Eng. Chan.   50 37 N   2 35W   3 20   Mitchaven   - Europe   England   Eng. Chan.   50 37 N   2 35W   3 20   Mitchaven   - Europe   Mitchaven   - Europe   Mitchaven   - Asia   Asia   Bengal   Hughly R.   22 35 N   88 29 E   Mitchaven   - Asia   Sandwich Is.   Pacif. Ocean   15 44 S 168 20 E   Mitchaven   - Asia   Sandwich Is.   Pacif. Ocean   54 0 S 38 30W   Mitchaven   - Amer.   Sandwich Is.   Pacif. Ocean   17 36 S 71 13W   Mitchaven   - Amer.   Mew Wales   Mitchaven   - Amer.   Mitchaven   Mitcha     |                    | -   | Amer.    | West indies   | An. Ocean      | 10 10 14  | 04 OW      | 1       |
| Cape Walsingham  | 1                  |     | A        | N7 XX7.1      | 17. J          | 50 47 N   | 04 7777    | į.      |
| Westman Isles  |                    |     | 1 .      |               |                |           |            | 1       |
| Westman Isles  | Cape Waisingham    | -   | ·        |               |                |           |            | 1,00    |
| Weymouth   |                    | -   |          | 1 - 2 -       | 1              |           |            | 1       |
| Whitby         -         -         Europe England         Germ. Sea Irish Sea         54 29 N S 23W S 20 Irish Sea         3 20 Irish Sea         54 25 N S 23W Irish Sea         11 15 Sea Irish Sea         54 25 N S 23W Irish Sea         11 15 Sea Irish Sea         15 44 S 168 20 E Sea Irish Sea         15 44 S 168 20 E Sea Irish Sea         15 44 S 168 20 E Sea Irish Sea         15 44 S 168 20 E Sea Irish Sea         15 44 S 168 20 E Sea Irish Sea         15 44 S 168 20 E Sea Irish Sea         15 44 S 168 20 E Sea Irish Sea         15 44 S 168 20 E Sea Irish Sea         15 44 S 168 20 E Sea Irish Sea         15 45 N S 23W Irish Sea Irish Sea         16 8 20 E Sea Irish Sea Irish Sea         16 8 20 E Sea Irish Sea         17 36 S Irish Sea         18 24 N Irish S   |                    | -   |          | 1             |                |           |            | 1 .     |
| Whitehaven   |                    | -   |          |               |                |           |            |         |
| Whitsuntide Island   |                    | -   | Europe   | England       |                |           |            | 3 20    |
| Fort William Willis' Isles Asia Amer. S. Georgia Sandwich Is. S. Georgia Sandwich Is. Sandwi   | Whitehaven -       | -   | Europe   | England       |                | 54 25 N   | 8 23W      | 11 15   |
| Fort William Willis' Isles Asia Amer. S. Georgia Sandwich Is. S. Georgia Sandwich Is. Sandwi   | Whitsuntide Island | -   |          |               | Pacif. Ocean   | 15 44 S   | 168 20 E   | 1       |
| Willis' Isles       -       Amer. Asia       S. Georgia       Atl. Ocean       54 0 8 38 30W 157 51W         Yarmouth Y.       -       -       Europe Amer. Amer. Amer. Amer. York Fort       -       -       England Peru Pacif. Ocean 17 36 S 71 13W       1 44 E 9 0 71 13W       9 0 71 13  |                    | -   | Asia     | l             |                | 22 35 N   | 88 29 E    | j       |
| Woahoo Island Y.   Yarmouth   -   Europe   England   Peru   Pacif. Ocean   21 48 N   157 51W   Yarmouth   -   Europe   England   Peru   Pacif. Ocean   17 36 8   71 13W   90 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |                    | -   | Amer.    |               |                |           |            | t       |
| Y.         Yarmouth         -         -         Europe Amer.         England Peru         Germ. Sea         52 37 N         1 44 E         9 0           York Fort         -         -         Amer.         New Wales         Hudson's Bay         57 2 N         92 52W         9 15           Yorkminster         -         -         Amer.         T'er. del Fue.         S. Ocean         55 26 S         70 8W           New York         -         -         Amer.         Jersey         Atl. Ocean         40 43 N         74 10W         3 0           Youghall         -         -         Europe         Ireland         Atl. Ocean         40 43 N         74 10W         3 0           Zachee         -         -         Amer.         Antilles         Atl. Ocean         18 24 N         67 43W           Zanzebar Island         -         Africa         Zanguebar         Ind. Ocean         6 50 S         40 5 E           Zaro -         -         Europe         Ind. Ocean         6 50 S         40 5 E           Zarotee         -         -         Europe         Ind. Ocean         6 50 S         40 5 E           Zarotee         -         -         Europe         Ind. Ocean  |                    | -   | 1        |               | Pacif. Ocean   |           |            | ł       |
| Yarmouth   |                    |     |          |               |                | 1         | 1          | 1       |
| Ylo  |                    | _`  | Europe   | England       | Germ Sea       | 52 37 N   | 1 44 E     | 9 0     |
| York Fort         -         -         Amer. Amer. Amer. Amer. Amer. Amer. Amer. Amer. Amer. Voughall         New York         -         -         -         Amer. Amer. Atl. Ocean Atl. Ocean Atl. Ocean Italy Africa Zanzebar Island         -  |                    |     |          |               |                |           |            | 1       |
| Yorkminster  |                    |     |          |               |                |           |            | 9 15    |
| New York   -   Amer,   Jersey   Atl. Ocean   40 43 N   74 10W   S 0  |                    | _   |          |               |                |           |            | 1 " "   |
| Youghall   |                    | -   |          |               | 1              |           |            | 9 0     |
| Z. Zachee Amer. Zant Island Europe Zanzebar Island - Africa Zanguebar Zaro Europe Zierick Zee Europe Zierick Zee Europe Zanguebar Zaro Europe Zierick Zee Europe Zierick Zee Europe Zierick Zee Zerope Zierick Zerope Zierick Zerope Zierick Zerope Zierick Zerope Zierick Zerope Zierick Z   |                    |     |          |               |                |           |            |         |
| Zachee   |                    | •   | Europe   | rretatio      | Au. Ocean      | 01 48 N   | 0 0W       | 7 30    |
| Zant Island -   Europe   Italy   Medit. Sea   37 48 N   21 20 E     Zanzebar Island -   Africa   Zanguebar   Ind. Ocean   6 50 S   40 5 E     Zaro -   Europe   Europe   United Prov.   Germ. Sea   51 38 N   3 58 E   1 30  |                    |     |          | A             | 441 0          | 1000      | 67 40777   | 1       |
| Zanzebar Island  |                    |     |          |               |                |           |            | I       |
| Zaro   Europe   Dalmatia   Medit. Sea   44 20 N   16 50 E     Zierick Zee   Europe   United Prov.   Germ. Sea   51 38 N   3 58 E   1 30  |                    |     |          |               |                |           |            | 1       |
| Zierick Zee - Europe United Prov. Germ. Sea 51 38 N 3 58 E 1 30  |                    | •   |          |               |                |           |            | .1      |
|  |                    | •   |          |               |                |           |            |         |
| Zoara   Africa   Barbary   Medit. Sea   32 45 N   11 55 E  |                    | •   |          |               |                |           |            |         |
|  | Zoara              | -   | Africa,  | 1 Barbary     | Medit. Sea     | 32 45 N   | 11 55 E    | ı       |

TABLE II.

| l              |   |          |         | <u> </u>              |              |            |            |            |              |    |      |        |          |            | _              | _   |          | _            |             |         |                |          |             |     |
|----------------|---|----------|---------|-----------------------|--------------|------------|------------|------------|--------------|----|------|--------|----------|------------|----------------|-----|----------|--------------|-------------|---------|----------------|----------|-------------|-----|
|                | 1818<br>1867<br>1866<br>1875<br>1894  |          | 4 23    | 27                    | 88 6         | ŜZ.        | -          | 01 to      | 4            | S  | O    | ~ °    |          | 2          | 12             | 13  | 4        | F4 5         | 2 2         | 18      | e 8            | 3 5      | 24 8        | 1   |
|                | 1817<br>1836<br>1855<br>1874<br>1893  |          | 13      | 191                   | 22.2         | 19         | ଛ          | 22         | 23           | 24 | 52   | 2 20   | 7 88     | 53         | z ~            | 01  | 8        | 4 r          | o 0         | -       | œ o            | , 0      | 2 = 2       |     |
|                | 1807 1808 1809 1810 1811 1812 1813 1814 1815 1816  1825 1827 1828 1829 1830 1831 1832 1833 1834  1845 1845 1847 1848 1849 1850 1851 1852 1853 1854  1864 1865 1866 1867 1868 1869 1870 1871 1872 1873  1883 1884 1885 1886 1887 1888 1889 1890 1891 |          | 01 00   | + rc                  | 100          | - œ        | 6          | 2=         | 12           | 13 | 7 :  | ۲, ۲   | 17       | 18         | 6 8            | 22  | 22       | 2, 2         | 25.2        | 56      | 27 8           | - Si     | z           |     |
|                | 1815<br>1834<br>1853<br>1872<br>1891  |          | 2 83 8  | 3 2                   | 52           | 3 57       | 88         | 63 Z       | -            | 03 | ω,   | 4· n   | 9        | 7          | <b>∞</b> σ     | 01  | =        | 20           | c 4         | 124     | 16             | 18       | o. 8        | }   |
|                | 1814<br>1833<br>1852<br>1871<br>1890  |          | 01 ::   | 2 2 2                 | 4 7          | . 9        | 17         | 8 G        | व्र          | 5  | 57 3 | i 5    | 25       | 97         | 27 88          | 23  | z        | - 0          | 4 63        | 4       | າວ ເ           | ٦,       | · oc o      | ا د |
|                | 18131<br>1832<br>1851<br>1870<br>1889   |          | 8 Z .   | <b>→</b> 01           | 1 00 4       | 22         | 9 1        | ~ &        | σ.           | 10 | Ξ;   | 7 0    | 3 7      | <u>т</u> , | 17             | 18  | 19       | 8 5          | 7 67        | 23      | 42 c           | 92       | 5 5         |     |
|                | 831<br>850<br>869<br>888  |          | 81 6    | 3 5                   | 8 8          | 3 52       | 52         | 2 6        | 82           | 53 | z'   | ٦ ٥    | 1 0      | 4          | S 0            | ~   | œ        | و د<br>د     | 2 =         | 12      | 13             | <u> </u> | 12          |     |
|                | 1811<br>1830<br>1849<br>1868<br>1868  |          | r & 0   | , O                   | 3 = 2        | 13         | 4.         | 16         | 12           | 18 | 19   | 3 5    | 22 22    | 23         | 4, 5           | 95  | 57       | - 58         | îz          |         | 03 0           | 2 4      | ' <b>()</b> |     |
|                | 1810<br>1848<br>1848<br>1867<br>1886  | AGE.     | 27.25   | 6<br>7<br>7<br>7<br>7 | 12           | 1 01       | <u>က</u>   | 4 <i>r</i> | 9            | 7  | 00 ( | ۍ  د   | 2 =      | 12         | 5 7            | 14  | 91       | 17           | 5 6         | 8       | 21             | 1 89     | 4,6         | -   |
| ARS            | 809<br>847<br>866<br>885  |          | F 16    | 282                   | 6 6          | 22         | <u> </u>   | 2 23       | 25           | 96 | 27   | X S    | î Z      | ~'         | C4 63          | 4   | 32       | 10           | - 00        | 6       | 2:             | 13       | 13          |     |
| TE.            | 808<br>1827<br>845<br>865<br>884  | MOONS    | 410     | 0 1-                  | - 00 0       | , O        | Ξ:         | 13         | 7            | Œ  | 91   | 27     | 61       | 8          | 2 2            | 53  | 25       | :0 e         | 3 67        | 8,      | <del>3</del> 2 | <u>-</u> | S1 05       |     |
| INSPECTION     | 1807 1808 1809 1810 1811 1812/1813<br>1825 1827 1829 1830 1831 1839<br>1845 1845 1847 1848, 1849 1850 1851<br>1864 1865 1866 1867 1868 1889 1889 1889   |          | 2 2 2   | 26.25                 | ₹ 67 8       | \$ 61      | Z          | - 6)       | 3            | 4  | v. ( | C t    | - 00     | 6          | 유 =            | 27  | 5        | 4 u          | 16          | 17      | 18             | 3        | 57 8        |     |
|                | 1825<br>1844<br>1863<br>1863  |          | 13 13   | <u> </u>              | 16           | 28         | 13         | 8 2        | 23           | 53 | 4 5  | 3 8    | 2 5      | 88         | S Z            | -   | 23       | ε 4          | + 10        | 9       | <b>-</b> α     | 0        | 5:          |     |
| BY             | 1824<br>1843<br>1862<br>1862  |          | C3 C    | ν <del>4</del>        | ינטי         | 2.1~       | œ          | 60         | =            | 13 | e :  | -      | 16       | 17         | 8 6            | 8   | 21       | 5 5          | 3 24        | 25      | 3 50           | 8,       | 6 Z         | -   |
| AGE            | 1823<br>1842<br>1842<br>1861  | ٠        | 6 8 S   | 7 2                   | 3 2          | 1.3        | 97         | 2 82       | 29           | z  | ~ (  | 21 0   | J .44    | 2          | 9 1            | œ   | 6        | 2:           | 12          | 13      | 4 4            | 16       | 17          |     |
| s.N.C          | 1803<br>1822<br>1841<br>1860<br>1879  |          | دەر     | 2 =                   | 22.2         | 3 4        | ניב (      | 17         | 18           | 19 | ಣ :  | 7 S    | 2 83     | 46         | 5 52           | 27  | 85       | 6 2          | ş <b>–</b>  | 61      | හ 4            | • 10     | 91          |     |
| СW             | 1802<br>1831<br>1840<br>1859<br>1878  |          | 2 8 8   | î z                   | ; <b>-</b> 0 | N 00       | 4          | 6 5        | 1            | œ  | 6.   | 2:     | 1 2      | 13         | <u> </u>       | 91  | 17       | 8 0          | 2 2         | 5       | 3 5            | 3 24     | 52          | -   |
| THE MOON'S AGE | 1801<br>1820<br>1839<br>1858<br>1877  |          | 16      | 2 6                   | 38 5         | 7 67       | <b>X</b> : | 25.        | 97           | 27 | 58   | 2, 2   | <b>-</b> | C)         | ω <del>4</del> | 10  | 9        | r- 0         | 0 60        | 10      | 11             | 13       | <u>7</u> 7  |     |
| FIND           | 1800<br>1819<br>1838<br>1857<br>1876  |          | 201     | - ∞                   | , o c        | <b>i</b> = | 12         | E 4        | [II.         | 91 | 7.   | × 0    | 2 8      | 2          | <b>31</b> 37   | 2.4 | 25       | 26<br>27     | 7 88        | 29      | z-             | • 01     | (0) ₹       | -   |
| TO FI          | Now.<br>Dec.  |          | 2 2 2   | 3 %                   | 1616         | 2 63       | 28         | 80.        | 1 31         |    | e .  | + W    | 0 00     | 7          | × 6            |     |          | <del></del>  | ~ #         |         | (O h           | - 00     | 6.0         | -   |
| 1              |   |          | 87 87 8 | 3 8                   | 167.6        | 5 63       | 9          | <u> </u>   | -            |    |      | _      |          | -          | <u> </u>       | Ξ.  | =        | ===          | <u>i</u>    | <u></u> | <u>= =</u>     | =        | 100         |     |
|                | Sept.   |          | 256     | - <del>c</del>        | ं का द       | 5 ==       |            | - 67       | 8            | 4  | ro c | 0 1    | - ∞      | 6          | 2 =            | 12  | 13       | 4 7          | 91          | 17      | 8 2            | 3 5      | 2 2         |     |
|                | Aug.  |          | l       |                       |              | -          | C1         | e 4        | 25           | 9  | r (  | 000    | 2        | =          | 2 5            | 14  | 15       | 116          | - 8         | 19      | <u> </u>       | : 37     | 87          |     |
| SE             | July.   |          | 25      | X 6                   |              |            | <b>თ</b> . | 4 ro.      | 9            | 7  | œ (  | ر<br>م | 2 =      | 2          | 13             | 5   | 9        | <u>7</u> . a | <u> </u>    | 유       | ۲, §           |          | 423         |     |
| MONTHS         | ane.  | AT.S.    | 7.88    | 2 S                   |              | N 00       | **         | IO 10      | Ī            | _  |      |        |          |            |                |     |          | ,            |             |         |                |          |             | ı   |
| MG             | ay. June.   | ٦        | 85 83 8 |                       | ;            |            |            |            | -            |    |      |        |          |            |                | -   |          |              |             |         |                |          | 25          | I   |
|                | ≥   |          | 30      | _                     | - 01.0       | 0 4        | S.         | - 0        | 1 8          | 6  | ≘:   | = :    | 3 2      | 14         | 15             | 17  | 18       | <u> </u>     | 3 2         | 53      | <u> </u>       | 25       | 27          |     |
|                | . Mar.  |          |         | 34 00                 | 3 4 n        | o 0        | _          | <b></b>    | 12           | 1  | 12   | 2 5    | 12       | 91         | 2 2            | 61  | 8        | <u> </u>     | 3 53        | 5       | 525            | 27       | 28          |     |
|                | Feb.  |          | T       | - 0                   | 100 4        | * 10       | 9          | ~ ∞        | 6            | 2  | = :  | N 0    | 5 4      | 15         | 16             | 8   | 61       | <u>8</u> 5   | 7 27        | 83      | 24             | 3 93     | 28          |     |
|                | Jan.  |          | 1 31    | υ 4                   | יטיי         | ۰.         | ∞          | o 0        | -            | 67 | 8    | 4      | 9 9      | 2          | 8 6            | 8   |          |              |             |         |                |          | 68          | 1   |
| _              |   | <u>-</u> | •       |                       |              |            |            |            | <del>,</del> | _  |      |        |          | =          | ==             | 24  | <u> </u> | <u> </u>     | <u>1 38</u> | M       | <u> </u>       | . 51     | ****        | 1   |

TABLE III. Epacts of Years.

|                | Epacts C                            | n Itals.      | ·        |
|----------------|-------------------------------------|---------------|----------|
| Years.         | Epacts.                             | Years.        | Epacts.  |
| B 1804         | 18 <sup>d</sup> 13 <sup>h</sup> 37′ | B 1844        | 10d22h14 |
| 1805           | 29 4 59                             | 1845          | 21 13 26 |
| 1806           | 10 7 16                             | 1846          | 2 15 53  |
| 1807           | 20 22 27                            | 1847          | 13 7 4   |
| B 1808         | 3 O 55                              | B 1848        | 24 22 16 |
| 1809           | 13 16 6                             | 1849          | 6 0 43   |
| 1810           | 24 7 18                             | 18 <i>5</i> 0 | 16 15 55 |
| 1811           | . 5 9 45.                           | 1851          | 27 7 6   |
| B 1812         | 17 0 57                             | B 1852        | 9 9 84   |
| . 1813         | 27 16 8                             | 1853          | 20 0 45  |
| 1814           | 8 18 35                             | 1854          | 1 3 12   |
| 1815           | 19 9 47                             | 1855          | 11 18 24 |
| B 1816         | 1 12 14                             | B 1856        | 23 9 35  |
| 1817           | 12 3 26                             | 1857.         | 4 19 2   |
| 1818           | 22 18 37                            | 1858          | 15 3 14  |
| 1819<br>P 1890 | 3 21 4                              | 1859          | 25 17 26 |
| B 1820         | 15 22 16                            | B 1860        | 7 20 58  |
| 1821           | 26 3 27<br>7 5 55                   | 1861          | 18 12 4  |
| 1822<br>1823   |                                     | 1862          | 29 3 16  |
| 1023           | 17 21 6                             | 1863          | 10 5 43  |
| B 1824         | 29 12 18                            | B 1864        | 21 20 55 |
| 1825           | 10 14 45                            | 1865          | 2 23 22  |
| 1826           | 21 5 57                             | 1866          | 18 14 88 |
| 1827           | 2 8 24                              | 1867          | 24 5 45  |
| B 1828         | 19 29 95                            | B 1868        | 6 8 12   |
| 1829           | 24 14 47                            | 1869          | 16 23 24 |
| 1830           | 5 17 14                             | 1870          | 27 14 35 |
| 1831           | 16 8 26                             | 1871          | 8 17 3   |
| B 1892         | 27 23 37                            | B 1872        | 20 8 14  |
| 1838           | 9 2 4                               | 1873          | 1 10 42  |
| 1834           | 19 17 16                            | 1874          | 12 1 58  |
| 1835           | 0 19 43                             | 1875          | 22 17 4  |
| B 1896         | 12 10 55                            | <b>B</b> 1876 | 4 20 32  |
| 1897           | 23 2 6                              | 1877          | 15 10 43 |
| 1838           | 4 4 34                              | 1878          | 26 1 55  |
| 1889           | 14 19 45                            | 1879          | 7 4 22   |
| B 1840         | 26 10 56                            | B 1880        | 18 19 33 |
| 1841           | 7 13 24                             | 1881          | 29 10 45 |
| 1842<br>1843   | 18 4 95                             | 1882          | 10 13 19 |
| 1848           | 28 19 47                            | 1888          | 21 4 24  |
|                |                                     |               |          |

TABLE IV. Epacts of Months.

| Months. | Epacts.  | Months.                                 | Epacts.      |
|---------|----------|---|--------------|
| January | Od Oh O' | July August Sept. October Novem. Decem. | . 8d 19h 36' |
| Febr.   | 1 11 16  |   | 5 6 52       |
| March   | 29 11 16 |   | 6 18 8       |
| April   | 1 9 48   |   | 7 5 24       |
| May     | 1 21 4   |   | 8 16 40      |
| June    | 3 8 20   |   | 9 8 55       |

In Leap Years, a day is to be subtracted from the sum of the Epacts, in the months of January and February.

TABLE V. 15 Correction to be added to the Time of High Water at Full and Change.

|      | High    | Water at    | Full an  | d Cha   | inge.         |
|------|---------|-------------|----------|---------|---------------|
| Moon | 's Age. | Correction. | Moon     | 's Age. | Correction.   |
| Oq   | Oh      | Oh O        | 15d      | Op      | 12h 8/        |
|      | 6       | 0 8         | 1        | 6       | 12 17         |
|      | 12      | 0 17        | l l      | 12      | 12 26         |
|      | 18      | 0 26        | ) ·      | 18      | 12 36         |
| 1    | 0       | 0 36        | 16       | 0       | 12 45         |
|      | 6       | 0 45        | l l      | 6       | 12 54         |
|      | 12      | 0 54        |          | 12      | 13 2          |
|      | 18      | 12          | ł        | 18      | 18 11         |
| 2    | 0       | 1 11        | 17       | 0       | 13 19         |
|      | 6       | 1 19        | ł        | 6       | 19 28         |
|      | 12      | 1 28        |          | 12      | 13 37         |
|      | 18      | 1 37        | 1        | 18      | 13 46         |
| 3    | O       | 1 46        | 18       | 0       | 13 54         |
|      | 6       | 1 54        | i        | 6       | 14 8          |
|      | 12      | 2 3         | 1        | 12      | 14 12         |
|      | 18      | 2 12        | 1        | 18      | 14 21         |
| 4    | 0       | 2 21        | 19       | 0       | 14 30         |
|      | 6       | 2 30        | 1        | 6       | 14 40         |
|      | 12      | 2 40        | 1        | 12      | 14 50         |
|      | 18      | ,2 50       |          | 18      | 15 1          |
| 5    | 0       | 3 1         | 20       | 0       | 15 11         |
| •    | 6       | 3 11        |          | 6       | 15 21         |
|      | 12      | 3 21        | ·        | 12      | 15 32         |
|      | 18      | 3 32        |          | 18      | 15 44         |
| 6    | 0       | 3 44        | 21       | 0       | 15 56         |
|      | 6       | S 56        |          | 6       | 16 9          |
|      | 12      | 4 9         |          | 12      | 16 28         |
|      | . 18    | 4 23        |          | 18      | 16 37         |
| 7    | 0       | 4 37        | 22       | 0       | 16 51         |
|      | 6       | 4 51        |          | 6       | 17 6          |
|      | 12      | 5 6         |          | 12      | 17 22         |
|      | 18      | 5 22        |          | 18      | 17 40         |
| . 8  | 0       | 5 40        | 23       | 0       | 18 0          |
| •    | 6       | 60          | i        | 6       | 18 20         |
|      | 12      | 6 20        | 1        | 12      | 18 39         |
|      | 18      | 6 39        | 1        | 18      | 18 58         |
| 9    | 0       | 6 58        | 24       | 0       | 19 18         |
|      | 6       | 7 18        | ł        | 6       | 19 37         |
|      | 12      | 7 57        | 1        | 12      | 19 56         |
|      | 18      | 7 56        | <u> </u> | 18      | 20 14         |
| 10   | 0       | 8 14        | 25       | 0       | 20 31         |
|      | 6       | 8 31        | Į.       | 6       | 20 47         |
|      | 12      | 8 47        | 1        | 12      | 21 2          |
|      | 18      | 9 2         | Ĭ        | 18      | 21 17         |
| 11   | 0       | 9 17        | 26       | 0       | 21 31         |
| •    | 6       | 9 81        | H        | 6       | 21 44         |
|      | 12      | 9 44        | ŀ        | 12      | 21 56         |
| • •  | 18      | 9 56.       |          | 18      | 22 9          |
| 12   | 0       | 10 9        | 27       | 0       | 22 21         |
|      | 6       | 10 21       |          | 6       | 22 32         |
|      | 12      | 10 32       |          | 12      | 22 43         |
|      | 18      | 10 43       |          | 18      | 22 <b>5</b> 3 |
| 13   | 0       | 10 53       | 28       | 0       | 23 3          |
|      | 6       | 11 3        | 1        | 6       | 23 13         |
|      | 12      | 11 13       | ł        | 12      | 23 23         |
| • •  | 18      | 11 23       | 1        | 18      | 23 33         |
| 14   | 0       | 11 33       | 29       | 0       | 23 42         |
|      | 6.      | 11 49       |          | 6       | 25 51         |
|      | 12      | 11 51       | 1        | 12      | 54 O          |
|      | 18      | 12 0        |          | - 1     |               |
|      |         |             |          |         |               |

## TABLE VI.

#### CONTAINING THE

## EQUATION OF THE TIME OF HIGH WATER,

Depending on the angular distance between the Sun and Moon, and on the distance of the Moon from the Earth.

| tim | par.<br>e of             | М            | oon              | 's H             | oriz             | onta             | l Pa             | rall                                  | ax.              | Appar.<br>time of<br>moon's | tin | ppar<br>me o      | f  'V                  | 1                      |                  | loris             |                  |                        | arall            | ax.              | Appar.<br>time of<br>moon's |
|-----|--------------------------|--------------|------------------|------------------|------------------|------------------|------------------|---------------------------------------|------------------|-----------------------------|-----|-------------------|------------------------|------------------------|------------------|-------------------|------------------|------------------------|------------------|------------------|-----------------------------|
| tra | nsit.                    | 5 <b>4</b> ′ | 55 <sup>1</sup>  | 56'              | 57'              | 58′              | 59 <sup>A</sup>  | 60′                                   | 61′              | transit.                    | tr  | ansit             | . 34/                  | 5 <b>5′</b>            | 56′              | 57′               | 58′              | 59                     | 60/              | 61'              | transit                     |
| Oh  | C'                       |              | add<br>20'<br>18 | add<br>21'<br>19 | add<br>22'<br>20 | add<br>23'<br>21 | add<br>25'<br>22 | add<br>26'<br>23                      | add<br>27'<br>24 | 12h0'                       | 6   | 5 <sup>h</sup> 0' | sub<br>35'<br>32       | sub<br>37'<br>34       | sub<br>39'<br>36 | sul.<br>41'<br>38 | sub<br>48'<br>40 | sub<br>45'<br>42       | sub<br>47/       | sub<br>50'<br>46 | 18h0'                       |
|     | 20<br>30                 | 14<br>12     | 15<br>13         | 16<br>13         | 17<br>14         | 18<br>15         | 19<br>16         | 20<br>17                              | 21<br>17         | 20<br>30                    |     | 20<br>30          | 29<br>25               | 30<br>27               | 32<br>28         | 34<br>30          | 36<br>31         | 38<br>33               | 40<br>35         | 42<br>36         | 20<br>30                    |
|     | <b>4</b> 0<br><b>5</b> 0 | 10<br>7      | 10<br>8          | 11<br>8          | 11<br>8          | 12<br>9          | •                | 13<br>10                              | 14<br>10         | . 40<br><i>5</i> 0          |     | 40<br><b>50</b>   | 21<br>16               | 22<br>1 <b>7</b>       | 23<br>18         | 25<br>19          | 26<br>20         | 27<br>21               | 29<br>22         | 30<br>23         | 40<br>50                    |
| 1   | 0<br>10                  | 5<br>2-      | 5                | 5<br>3           | 6 3              | 6                | 6                | 7 3                                   | 7,               | 13 0<br>10                  | 7   | 0                 | 11                     | 12                     | 12<br>6          | 13                | 14               | 14                     | 1 <i>5</i><br>8  | 16<br>8          | 19-0<br>10                  |
|     | 20                       | sub<br>2     | sub<br>3         |                  | sub<br>3         | sub<br>3         | sub<br>3         | sub<br>3                              | sub<br>3         | 20                          |     | 20<br>30          | add                    |                        |                  | add<br>7          |                  |                        | add<br>1-8       |                  | 20<br>30                    |
|     | 40<br>50                 | 5 7          | 5<br>8           | <i>5</i><br>8    | 6 8              | 6 9              | 6                | 7                                     | 7<br>10          | 40<br>50                    |     | 40<br>50          | 11<br>16               | 12<br>17               | 12<br>18         | 13<br>19          | 14               | 15<br>21               | 15               | 16<br>23         | 40<br><b>50</b>             |
| 2   | 0<br>10                  | 10<br>12     | 10<br>13         | 11<br>13         | 11<br>14         | 12<br>15         |                  | 13<br>17                              | 14<br>17         | 14 0<br>10                  | 8   | 0                 | 21<br>25               | 22<br>27               | 23<br>28         | 25<br>30          | <br>26<br>31     | 27<br>33               | 29<br>35         | 30<br>36         | 20 O<br>10                  |
|     | 20<br>30                 | 17           | 15<br>18         | 19               | 20               | 21.              | 22               | 20<br>23                              | 21<br>24         | 20<br>30                    |     | 20<br>30          | 29<br>32               | 30<br>34               | 32<br>36         | 34<br>38          | 36<br>40         | 38<br>42<br>45         | 40<br>44<br>47   | 42<br>46<br>50   | 20<br>30                    |
|     | 40<br><i>5</i> 0         |              | 20<br>22         | 21<br>24<br>     |                  | 23<br>26         | 25<br>28<br>——   | 26<br>29                              | 27<br>50         | 40<br>50                    |     | 40<br>50          | 35<br>37               | 37<br>39               | 39<br>41         | 41<br>43          | 43<br>45<br>     | 48                     | 50               | <i>5</i> 3       | 40<br><b>5</b> 0            |
| 3   | 0<br>10                  | 25           | 25<br>27         |                  | 30               |                  | 33               | 32<br>35                              | 34<br>37         | 15 O<br>10                  | 9   | 10                | 38<br>39               | 40<br>41               | 42<br>44         | 45<br>46          | 47<br>48         | 50<br>51<br>52         | 52<br>54<br>55   | 55<br>56<br>5?   | 21 0<br>10                  |
|     | 20<br>30<br>40           | 29           | 29<br>31<br>33   | 33               | 32<br>34<br>37   |                  | 36<br>38<br>41   | <b>3</b> 8<br><b>40</b><br><b>4</b> 3 | 40<br>42<br>45   | 20<br>30<br>40              |     | 20<br>30<br>40    | 40<br>40<br>40         | 42<br>42<br>42         | 44<br>45<br>45   | 47<br>47<br>47    | 49<br>50<br>50   |                        | 55<br>55         | 58<br>58         | 20<br>50<br>40              |
|     | 50                       | 33<br>——     | 35               | 37<br>           | 39               | 41<br>—          | 43               | 45                                    | 47               | 50                          | _   | 50                | 40                     | 42<br>                 | 44               | 47                | 49               |                        |                  | <i>5</i> 7       | 50                          |
| 4   | 0<br>10<br>20            |              | 36<br>38<br>39   |                  | 40<br>42<br>44   | 43<br>44<br>46   | 45<br>47<br>48   | 47<br>49<br>51                        | 49<br>52<br>53   | 16 0<br>10<br>20            | 1   | 0 0<br>10<br>20   | 39 '<br>38<br>37       | 41<br>40<br>39         | 43<br>42<br>41   | 46<br>45<br>44    | 48<br>47<br>46   | 51<br>50<br><b>4</b> 8 | 53<br>52 -<br>51 | 56<br>55<br>53   | 22 0<br>10<br>20            |
|     | 30<br>40                 | 38<br>39     | 40<br>41<br>42   | 42<br>43         | 45<br>46         | 47<br>48         | 50<br>51         | 52<br>53<br>54                        | 55<br>56<br>57   | 30<br>40<br>50              |     | 30<br>40<br>50    | 36<br>34<br><b>9</b> 3 | 38<br>36<br>3 <b>5</b> | 40<br>38<br>37   |                   | 44<br>48<br>41   |                        |                  | 52<br>49<br>47   | 30<br>40<br>50              |
|     | <i>5</i> 0               |              |                  |                  |                  | _                | !                |                                       | _                |                             | -   |                   |                        | -                      | 31<br>35         |                   | 39               | 41                     | 43               | 45               |                             |
| 5   | 0<br>10<br>20            | 40           | 42<br>42<br>42   | 45               |                  | 50               | 52               | 55<br>55<br>55                        | 58<br>58<br>57   | 17 0<br>10<br>20            | '   | 1 0<br>10<br>20   | 31<br>29<br>27         | 33<br>31<br>29         | 33<br>30         | 34                | 36               | 38                     | 40<br>38         | 42<br>40         | 23 0<br>10<br>20            |
|     | 30<br><b>4</b> 0         | 39<br>38     | 41<br>40         | 44<br>42         | 46<br>45         | 48<br>47         | 51<br>50         | 54<br>52                              | 56<br>55         | 30.<br>40                   |     | 30<br>40          | 25<br>23               | 27<br>25               | 28<br>26         | 30<br>27          | 31<br>29         | 30                     | 35<br>3 <b>2</b> | 37<br>34         | €0<br>40                    |
| 6   |                          |              | 39<br>37         |                  |                  |                  |                  | 50<br>47                              | 53<br>50         | 50<br>18 0                  | 1   | 50<br>2 0         | 21<br>19               | 92<br>20               | 24<br>21         |                   |                  | 28<br>25               |                  | 30<br>27         | 50<br>24 0                  |
| im  | par.<br>e of             | 54           | 55′              | 56′              | 57′              | 58/              | 59′              | 60′                                   |                  | Appar.<br>time of           | tin | par.<br>ne of     | <u> </u>               | 35'                    | 56′              | 57′               | 58′              | 59'                    | 60′              | 61′              | Appar<br>time o             |
|     | nsit.                    | M            | oon              | 's H             | orizo            | onta             | l Pa             | ralla                                 |                  | transit.                    |     | ınsit.            |                        | con                    | 's H             | criz              | onta             | d Pa                   | ıralla           | ıx.              | transi                      |

TABLE VII.

THE MILES AND PARTS OF A MILE IN A DEGREE OF LONGITUDE

AT EVERY DEGREE OF LATTTUDE.

| ll   |                       |   |                |  |                |      |               |      | <u> </u> |      |        |
|------|-----------------------|---|----------------|--|----------------|------|---------------|------|----------|------|--------|
| D.L. | Miles.                | D.L.  | Miles.         | D.L.   | Miles.         | D.L. | Miles.        | D.L. | Miles.   | D.L. | Miles  |
| 1    | 59.99                 | 16  | 57.67          | 31   | 51.43          | 46   | 41.68         | 61   | 29.09    | 76   | 14.52  |
| 2    | 59.96                 | 17  | 57.38          | 32   | 50.88          | 47   | 40.92         | 62   | 28.17    | 77   | 13.50  |
| 3    | 59.92                 | 18  | 57.06          | 33   | 50.32          | 48   | 40.15         | 63   | 27.24    | 78   | 12.47  |
| 4    | <i>5</i> 9.8 <i>5</i> | 19  | 56.73          | 34   | 49.74          | 49   | 39.36         | 64   | 26.30    | 79   | 11.45  |
| 5    | 59.77                 | 20  | 56.38          | 35   | 49.15          | 50   | 38.57         | 65   | 25.36    | 80   | 10.42  |
| 6    | 59.67                 | 21  | 56.01          | 36   | 48.54          | 51   | 37.76         | 66   | 24.40    | 81   | 9.39   |
| 7    | 59.55                 | 22  | 55.63          | 37   | 47.92          | 52   | 36.94         | 67   | 23.44    | 82   | 8.35   |
| 8    | 59.42                 | 23  | 55.23          | 38   | 47.28          | 53   | 36.11         | 68   | 22.48    | 83   | 7.31   |
| 9    | 59.26                 | 24  | 54.81          | 39   | 46.63          | 54   | 35,27         | 69   | 21.50    | 84   | 6.27   |
| 10   | 59.08                 | 25  | 54.38          | 40   | 45.96          | 55   | 34.41         | 70   | 20.52    | 85   | 5.23   |
| 11   | 58.89                 | 26  | 53.93          | 41   | 45.28          | 56   | <b>3</b> 3.55 | 71   | 19.53    | 86   | 4.19   |
| 12   | 58.68                 | 27  | 53.46          | 42   | 43.26<br>44.59 | 57   | 32.68         | 72   | 19.55    | 87   | 3.14   |
| 13   | 58.46                 | 28  | 52.97          | 43   |                | 58   | 31.80         | 73   | 17.54    | 88   | 2.09   |
| 13   | 58. <b>22</b>         | 29  | 52.97<br>52.47 | 44   | 43,88<br>48.16 | 59   | 30.90         | 74   | 16.54    | 89   |        |
|      |                       | 14 E  |                | 45   |                |      |               | 1    |          |      | . 1.05 |
| 15   | 57.95                 | 30  | 51.96          | 95   | 42.43          | 60   | 30.00         | 75   | 15.53    | 90   | 0.00   |
|      |                       | <u> -  -  -  -  -  -  -  -  -  -  -  -  -  </u> |                | <u>                                     </u> |                | , ,  |               | 1    | •        |      |        |

TABLE VIII.

|     | No. 1   | 100 |           |      |         | Log  | . 1.00000- | 2.00 | 0000    |
|-----|---------|-----|-----------|------|---------|------|------------|------|---------|
| No. | Log.    | No. | Log.      | No.  | Log.    | No.  | Log.       | No.  | Log.    |
| 1   | 0.00000 | 21  | 1,32222   | 41   | 1.61278 | 61   | 1.78533    | 81   | 1.9 849 |
| 2   | 0.30103 | 22  | 1.34242   | 42   | 1.62325 | 62   | 1.79239    | 82   | 1.91381 |
| 3   | 0.47712 | 23  | 1.36173   | 43   | 1.63347 | 63   | 1.79934    | 83   | 1.91908 |
| 4   | 0.60206 | 24  | 1.38021   | 44   | 1.64345 | 64   | 1.80618    | 84   | 1.92428 |
| 5   | 0.69897 | 25  | 1,39794   | 45   | 1.65321 | 65   | 1.81291    | 85   | 1.92942 |
| 6   | 0.77815 | 26  | 1.41497   | 46   | 1.66276 | 66   | 1.81954    | 86   | 1.93450 |
| 7   | 0.84510 | 27  | 1.43136 , | 47   | 1.67210 | 67   | 1.82607    | 87   | 1.93952 |
| 8   | 0.90309 | 28  | 1.44716   | 48   | 1.68124 | 68   | 1.88251    | 88   | 1.9444  |
| 9   | 0.95424 | 29  | 1.46240   | 49   | 1.69020 | 69   | 1.83885    | 89   | 1.94939 |
| 10  | 1.00000 | 30  | 1.47712   | 50   | 1.69897 | 70   | 1.84510    | 90   | 1.95424 |
| 11  | 1.04139 | 31  | 1.49136   | 51   | 1.70757 | 71   | 1.85126    | 91   | 1.95904 |
| 12  | 1.07918 | 32  | 1.50515   | 52   | 1.71600 | 72   | 1.85733    | 92   | 1.96379 |
| 13  | 1.11394 | 33  | 1.51851   | 53   | 1.72428 | 73   | 1.86332    | 93   | 1.96848 |
| 14  | 1.14613 | 34  | 1.53148   | 54   | 1.73239 | • 74 | 1.86923    | 94   | 1.97313 |
| 15  | 1.17609 | 35  | 1.54407   | 55   | 1.74036 | 75   | 1.87506    | 95   | 1.97772 |
| 16  | 1.20412 | 36  | 1.55630   | • 56 | 1.74819 | 76   | 1.88081    | 96   | 1.98227 |
| 17  | 1.23045 | 37  | 1.56820   | 57   | 1.75587 | 77   | 1.88649    | 97   | 1.98677 |
| 18  | 1.25527 | 38  | 1.57978   | 58   | 1.76949 | 78   | 1.89209    | 98   | 1.99129 |
| 19  | 1.27875 | 39  | 1.59106   | 59   | 1.77085 | 79   | 1.89763    | 99   | 1.99564 |
| 20  | 1.30103 | 40  | 1.60206   | 60   | 1.77815 | 80   | 1.90309    | 100  | 2.00000 |

TABLE VIII.
LOGARITHMS OF NUMBERS.

|                    | No. 100-       | 16             | 00                     | <del></del>                      |                | <del>~~~~~~</del>                | Log. 0         | 0000-                      | -20412         |                |
|--------------------|----------------|----------------|------------------------|----------------------------------|----------------|----------------------------------|----------------|----------------------------|----------------|----------------|
| No.                | 0              | 1              | 2                      | 3                                | 4              | 5                                | 6              | 7                          | 8              | 9              |
| 100                | 00000          | 00048          | 00087                  | 00130                            | 00173          | 00217                            | 0)_60          | 00303                      | 00346          | 00389          |
| 101                | 00432          | 00475          | 00518                  | 00561                            | 00604          | 00647                            | 00689          | 00732                      | 00775          | 00817          |
| 102<br>103         | 00860          | 00903          | 00945                  | 00988                            | 01030          | 01072                            | 01115          | 01157                      | 01199          | 01242<br>01662 |
| 104                | 01703          | 01745          | 01787                  | 01828                            | 01870          | 01912                            | 01953          | 01995                      | 02036          | 02078          |
| 105                | 02119          | 02160          | 02202                  | 02243                            | 02284          | 02325                            | 02366          | 02407                      | 02449          | 02499          |
| . 106              | 02531          | 02572          | 02612                  | 02653                            | 02694          | 02735                            | 02776          | 02816                      | 02857          | 02898          |
| 107                | 02938          | 02979          | 03019                  | 03060                            | 03100          | 03141                            | 03181          | 03222                      | 03262          | 03302          |
| 108<br>109         | 03342          | 09388          | 03423<br>03822         | 03468<br>03862                   | 03503<br>03902 | 03543<br>03941                   | 03583<br>03981 | 04021                      | 03663          | 03703<br>04100 |
|                    | 04139          | 04179          | 04218                  | 04258                            | 04297          | 04336                            | 04376          | 04415                      | 04454          | 04493          |
| 110<br>111         | 04532          | 04571          | 04610                  | 04650                            | 04689          | 04727                            | 04766          | 04805                      | 04844          | 04883          |
| 112                | 04922          | 04961          | 04999                  | 05038                            | 05077          | 05115                            | 05154          | 05192                      | 05231          | 05269          |
| 113                | 05308          | 05346          | 05385                  | <b>0542</b> 3                    | 05461          | 05500                            | 05538          | 05576                      | 05614          | 05652          |
| 114                | 05690          | 05729          | 05767                  | 05805                            | 05843          | 05881                            | 05918          | 05956                      | 05994          | 06032          |
| 115                | 06070          | 06108          | 06145                  | 06188                            | 06221          | 06258                            | 06296          | 06333<br>06707             | 06371          | 06408          |
| 116.<br>117        | 06446          | 06483<br>06856 | 06521<br>068 <b>93</b> | 065 <b>5</b> 8<br>069 <b>5</b> 0 | 06595          | 06633                            | 06670<br>07041 | 07078                      | 06744          | 06781<br>07151 |
| 118                | 07188          | 07225          | 07262                  | 07298                            | 07335          | 07372                            | 07408          | 07445                      | 07482          | 07518          |
| 119                | 07555          | 07591          | 07628                  | 07664                            | 07700          | 07737                            | 07773          | 07809                      | 07846          | 07882          |
| 120                | 07918          | 07954          | 07990                  | 08027                            | 08063          | 08099                            | 08135          | 08171                      | 08207          | 08243          |
| 121                | 08279          | 08314          | 08350                  | 08386                            | 08422          | 08458                            | 08493          | 08529                      | 08565          | 08600          |
| 122                | 08636          | 08672          | 08707                  | 08743                            | 08778          | 08814                            | 08849          | 08884                      | 08920          | 08955          |
| 123                | 06991          | 09026          | 09061                  | 09096                            | 09132          | 09167                            | 09902          | 09237<br>09587             | 09272          | 09907          |
| 124<br>125         | 09342<br>09691 | 09377          | 09412<br>09760         | 09447<br>09795                   | 09482<br>09830 | 09517<br>09864                   | 09552<br>09899 | 09934                      | 09621          | 09656<br>10003 |
| 126                | 10037          | 10072          | 10106                  | 10140                            | 10175          | 10209                            | 10243          | 10278                      | 10312          | 10346          |
| 127                | 10380          | 10415          | 10449                  | 10485                            | 10517          | 10551                            | 10585          | 10619                      | 10653          | 10687          |
| 128                | 10721          | 10755          | 10789                  | 10823                            | 10857          | 10890                            | 10924          | 10958                      | 10992          | 11025          |
| 129                | 11059          | 11093          | 11126                  | 11160                            | 11193          | 11227                            | 11261          | 11294                      | 11327          | 11361          |
| 130                | 11394          | 11428          | 11461                  | 11494                            | 11528          | 11561                            | 11594          | 11628                      | 11661          | 11694          |
| 131                | 11727          | 11760          | 11793                  | 11826                            | 11860          | 11893                            | 11926          | 11959                      | 11992          | 12024          |
| 1 <b>32</b><br>133 | 12057<br>12885 | 12090<br>12418 | 12123<br>12450         | 12156<br>12483                   | 12189          | 12222<br>12548                   | 12254<br>12581 | 1 <b>2287</b><br>12613     | 12320          | 12352<br>12678 |
| 134                | 12710          | 12743          | 12775                  | 12808                            | 12840          | 12872                            | 12905          | 12937                      | 12969          | 13001          |
| 135                | 13033          | 13066          | 13098                  | 13130                            | 13162          | 13194                            | 13226          | 13258                      | 13290          | 13322          |
| 136                | 13354          | 13386          | 13418                  | 13450                            | 13481          | 13513                            | 13545          | 18577                      | 13609          | 13640          |
| 137                | 13672          | 18704          | 13735                  | 13767                            | 13799          | 13830                            | 13862          | 13893                      | 13925          | 13956          |
| 138                | 13988          | 14019          | 14051                  | 14082                            | 14114          | 14145                            | 14176          | 14208                      | 14239          | 14270          |
| 139                | 14301          | 14333          | 14364                  | 14395                            | 14426          | 14457                            | 14489          | 14520                      | 14551          | 14582          |
| 140<br>141         | 14618<br>14922 | 14644<br>14958 | 1467 <i>5</i><br>14983 | 14706<br>15014                   | 14737<br>15045 | 14768                            | 14799<br>15106 | 14829<br>15137             | 14860<br>15168 | 14891          |
| 142                | 15229          | 15259          | 15290                  | 15320                            | 15951          | 1 <i>5</i> 076<br>1 <i>5</i> 381 | 15412          | 15442                      | 15478          | 15198<br>15503 |
| 145                | 15534          | 15564          | 15594                  | 15625                            | 15655          | 15685                            | 15715          | 15746                      | 15776          | 15806          |
| 144                | 15836          | 15866          | 15897                  | 15927                            | 15957          | 15987                            | 16017          | 16047                      | 16077          | 16107          |
| 145                | 16187          | 16167          | 16197                  | 16227                            | 16256          | 16286                            | 16316          | 16346                      | 16376          | 16406          |
| 146                | 16435          | 16465          | 16495                  | 16524                            | 16554          | 16584                            | 16613          | 16643                      | 16673          | 16702          |
| 147<br>148         | 16732<br>17026 | 16761<br>17056 | 16791<br>17085         | 16820<br>17114                   | 16850<br>17143 | 16879<br>17173                   | 16909<br>17202 | 16938<br>17231             | 16967<br>17260 | 16997<br>17289 |
| 149                | 17819          | 17348          | 17377                  | 17406                            | 17435          | 17464                            | 17493          | 17522                      | 17551          | 17580          |
| 150                | 17609          | 17638          | 17667                  | 17696                            | 17725          | 17754                            | 17782          | 178:1                      | 17840          | 17869          |
| 151                | 17898          | 17926          | 17955                  | 17984                            | 18013          | 18041                            | 18070          | 18099                      | 18127          | 18156          |
| 152                | 18184          | 18213          | 18241                  | 18270                            | 18298          | 18327                            | 18335          | 18384                      | 18412          | 18441          |
| 153                | 18469          | 18498          | 18526                  | 19554                            | 18583          | 18311                            | 18689          | 18667                      | 18696          | 18724          |
| 154<br>155         | 18752<br>19033 | 18780<br>19061 | 18808<br>19089         | 18837<br>19117                   | 18865<br>19145 | 18893<br>19173                   | 18921<br>19201 | 18949<br>1922 <del>9</del> | 18977<br>19257 | 19005          |
| 156                | 19812          | 19340          | 19368                  | 19317                            | 19145          | 19451                            | 19201          | 19229                      | 19535          | 19285<br>19562 |
| 157                | 19590          | 19618          | 19645                  | 19673                            | 19700          | 19728                            | 19756          | 19783                      | 19811          | 19838          |
| 158                | 19866          | 19893          | 19921                  | 19948                            | 19976          | 20003                            | 20030          | 20358                      | 20085          | 20112          |
| 1.59               | 20140          | 20167          | 20194                  | 20222                            | 20249          | 20276                            | 20303          | 20330                      | 20358          | 20385          |
|                    |                |                |                        |                                  |                |                                  |                |                            |                | <del></del>    |

TABLE VIII.

|  | No. 160        | 0              | 2200                    |                |                       |                | Log.           | 20412-         | 34249                  | 2                                |
|--|----------------|----------------|-------------------------|----------------|-----------------------|----------------|----------------|----------------|------------------------|----------------------------------|
| No.  | 6              | 1              | 2                       | 3              | 4                     | 5              | 6              | 7              | 8                      | 9                                |
| 160  | 20412          | 20439          | 20466                   | 20493          | 20520                 | 20548          | 20575          | 20602          | 20629                  | 20656                            |
| 161  | 20683          | 20710          | 20737                   | 20763          | 20790                 | 20817          | 20844          | 20871          | 20898                  | 20925                            |
| 162  | 20952          | 20978          | 21005                   | 21032          | 21059                 | 21085          | 21112          | 21139          | 21165                  | 21192                            |
| ` 163  | 21219          | 21245          | 21272                   | 21299          | 21325                 | 21352          | 21378          | 21405          | 21431                  | 21458                            |
| 164  | 21484          | 21511          | 21537                   | 21564          | 21590                 | 21617          | 21643          | 21669          | 21696                  | 21722                            |
| 165  | 21748          | 21775          | 21801                   | 21827          | 21854                 | 21880          | 21906          | 21952          | 21958                  | 21985                            |
| 166  | 22011          | 22037          | 22063                   | 22089          | 22115                 | 22141          | 22167          | 22194          | 99220                  | 22246                            |
| 167  | 22272          | 22298<br>22557 | 22324                   | 22350          | 22376                 | 22401          | 22427          | 22453          | 22479                  | 22505                            |
| 168<br>169   | 22531<br>22789 | 22814          | 22583<br>22840          | 22608<br>22866 | 22634<br>22891        | 22660          | 22686<br>22943 | 22712<br>22968 | 22737<br>22994         | 22763                            |
| 109  | 22109          | 22017          | 22040                   | 22000          | 22051                 | 22917          | 22343          | 22390          | 24752                  | 29019                            |
| 170  | 23045          | 23070          | 23096                   | 23121          | 23147                 | 23172          | 23198          | 23223          | 23249                  | 23274                            |
| 171  | 23300          | 23325          | 23350                   | 23376          | 23401                 | 23426          | 23452          | 23477          | 23502                  | 23528                            |
| 172  | 23553          | 23578          | 23603                   | 23629          | 23654                 | 23679          | 28704          | 23729          | 23754                  | 23779                            |
| 173  | 23805          | 23830          | 23855                   | 23880          | 23905                 | 23930          | 23955          | 23980          | 24005                  | 24030                            |
| 174  | 24055          | 24080          | 24105                   | 24130          | 24155                 | 24180          | 24204          | 24229          | 24254                  | 24279                            |
| 175  | 24304          | 24329          | 24353                   | 24378          | 24408                 | 24428          | 24452          | 24477          | 24502                  | 24527                            |
| 176  | 24551          | 24576          | 24601                   | 24625          | 24650<br>24895        | 24674          | 24699          | 24724          | 24748<br>2499 <b>3</b> | 24778                            |
| 177  | 24797<br>25042 | 24822<br>25066 | 24846<br>25091          | 24871<br>25115 | 25139                 | 24920<br>25164 | 24944<br>25188 | 24969<br>25212 | 25237                  | 25018<br>25261                   |
| 172<br>173<br>174<br>175<br>176<br>177<br>178<br>179 | 25285          | 25310          | 25334                   | 25358          | 25382                 | 25406          | 25431          | 25455          | 25479                  | 25508                            |
| 113  | [              |                |                         |                |                       |                |                |                |                        |                                  |
| 180<br>181   | 25527          | 25551          | 25575                   | 25600          | 25624                 | 25648          | 25672          | 25696          | 25720                  | 25744                            |
|  | 25768          | 25792          | 25816                   | 25840          | 25864                 | 25888          | 25912          | 25935          | 25959                  | 25989                            |
| 182  | 26007<br>26245 | 26031<br>26269 | 26055<br>25 <b>2</b> 93 | 26079<br>26316 | 26102<br>26340        | 26126<br>26364 | 26150<br>26387 | 26174<br>26411 | 26198<br>2643 <i>5</i> | 26 <b>2</b> 21<br>26 <b>4</b> 58 |
| 183<br>184   | 26482          | 26505          | 26529                   | 26553          | 26576                 | 26600          | 26623          | 26647          | 26670                  | 26694                            |
| 185  | 26717          | 26741          | 26764                   | 26788          | 26811                 | 26834          | 26858          | 26881          | 26905                  | 26928                            |
| 186  | 26951          | 26975          | 26998                   | 27021          | 27045                 | 27068          | 27091          | 27114          | 27138                  | 27161                            |
| 187  | 27184          | 27207          | 27231                   | 27254          | 27277                 | 27300          | 27323          | 27946          | 27370                  | 27393                            |
| 188  | 27416          | 27439          | 27462                   | 27485          | 27508                 | 27531          | 27554          | 27577          | 27600                  | 27623                            |
| 189  | 27646          | 27669          | 27692                   | 27715          | 27788                 | 27761          | 27784          | 27807          | 27830                  | 27852                            |
| 190  | 27875          | 27898          | 27921                   | 27944          | 27967                 | 27989          | 28012          | 28035          | 28068                  | 28061                            |
| 191  | 28103          | 28126          | 28149                   | 28171          | 28194                 | 28217          | 28246          | 28262          | 29285                  | 28307                            |
| 192  | 28330          | 28353          | 28375                   | 28398          | 28421                 | 28443          | 28466          | 28488          | 28511                  | 28533                            |
| 193  | 28356          | 28578          | 28601                   | 28623          | 28646                 | 28668          | 28691          | 28713          | 28735<br>28959         | 28758                            |
| 194  | 28780          | 28803<br>29026 | 28825                   | 28847          | 28870<br>29092        | 28892<br>29115 | 28914<br>29137 | 28937<br>29159 | 29181                  | 28981                            |
| 195<br>196   | 29003<br>29226 | 29248          | 29048<br>29270          | 29070<br>29292 | 29314                 | 29336          | 29358          | 29380          | 29403                  | 29203<br>29425                   |
| 190  | 29447          | 29469          | 29491                   | 29513          | 29535                 | 29557          | 29579          | 29601          | 29623                  | 29645                            |
| 198  | 29667          | 29688          | 29710                   | 29732          | 29754                 | 29776          | 29798          | 29820          | 29842                  | 29863                            |
| 199  | 29885          | 29907          | 29929                   | 29951          | 29973                 | 29994          | 30016          | 30038          | 30060                  | 30081                            |
| 200  | 30103          | 30125          | 30146                   | 30168          | 30190                 | 30211          | 30233          | 30255          | 30276.                 | 30298                            |
| 201  | 30323          | 30341          | 30363                   | 30384          | 30406                 | 30428          | 30449          | 30471          | 80492                  | 30514                            |
| 202  | 30535          | 30557          | 30578                   | 3060 <b>0</b>  | 30621                 | 30648          | 30664          | 3,685          | 30707                  | 90728                            |
| 203  | 307 <i>5</i> 0 | 30771          | 30792                   | 30814          | <b>3</b> 083 <i>5</i> | 30856          | 30878          | 30899          | 30920                  | 30942                            |
| 204  | 30963          | 30984          | 31,006                  | 31027          | 31048                 | 31069          | 31091          | 31112          | 31133                  | 31154                            |
| 205  | 31175          | 31197          | 31218                   | 31239          | 31260                 | 31281          | 91302          | 31328          | 91945                  | 31366                            |
| 206  | 31337          | 31408          | 31429                   | 31450          | 31471                 | <b>314</b> 92  | 31513          | 31534          | 31555                  | 31576                            |
| 207  | 31597          | 31618          | 31639                   | 81660          | 31681                 | 31702          | 31723          | 31744          | 31765                  | 31785                            |
| 208  | 31806          | 31827          | 31848                   | 31869          | 31890                 | 81911          | 91931          | 31952          | 31973                  | 91994                            |
| 209  | 32015          | 32035          | 32056                   | 32077          | 32098                 | 32118          | 32139          | 32160          | 32181                  | 32201                            |
| 210  | 32222          | 32243          | 32263                   | 32284          | 32305<br>32510        | 32325<br>32531 | 32346          | 32366<br>32572 | 32387<br>32593         | 32408                            |
| 212  | 32498<br>32634 | 32449<br>32654 | 32469<br>3267 <i>5</i>  | 99605          | 32715                 | 32736          | 32552<br>32756 | 32777          | 32797                  | 32613<br>32818                   |
| 212  | 32838          | 32858          | 32879                   | 32695<br>32899 | 52919                 | 32940          | 32960          | 32980          | 33001                  | 33021                            |
| 214  |                | 33062          | 33082                   | 35102          | 33122                 | 33148          | 33163          | 38188          | 83203                  | 38224                            |
| 215  | 33244          | 33264          | 33284                   | 33304          | 33325                 | 33345          | 33365          | 35385          | 38405                  | 33425                            |
| 216  | 33445          | 33465          | 33486                   | 33506          | 33526                 | \$3546         | 33566          | 83586          | 33606                  | 33626                            |
| 217  | 33646          | 33666          | 33686                   | 53706          | 33726                 | 33746          | 33766          | 33786          | 33806                  | 35826                            |
| 218  | 33846          | 33866          | 33885                   | 33905          | 33925                 | S3945          | 93965          | -83985         | 84005                  | 34025                            |
| 219  | 34044          | 34064          | 34084                   | 34104          | 34124                 | 34148          | 34163          | 34183          | 34208                  | 34223                            |
|  | 0              | 1              | 0                       | 9              | 4                     |                | 6              | 7              | 8                      | 9                                |

## TABLE VIII.

|            | No. 2200 | 2               | 800           | -,            |        | ,     | Log. 3 | 4242          | 44716         |       |
|------------|----------|-----------------|---------------|---------------|--------|-------|--------|---------------|---------------|-------|
| No.        | 0        | . 1             | . 2           | S             | 4      | 5     | 6      | 7             | 8             | 9     |
| 220        | 34242    | 34262           | 34282         | 34301         | 34321  | 34341 | 34361  | 34380         | 34400         | 34420 |
| 221        | 34439    | 34459           | 34479         | 34498         | 34518  | 34537 | 34557  | 84577         | 34596         | 34616 |
| 222        | 34635    | 34655           | 34674         | 34694         | 34713  | 34733 | 34753  | 34772         | 34792         | 34811 |
| 223        | 34830    | 34850           | 34869         | 34889         | 34908  | 34928 | 34947  | 34967         | 34986         | 35005 |
| 224        | 35025    | 35044           | 35064         | 35083         | 35102  | 35122 | 35141  | 35160         | <b>3</b> 5180 | 35199 |
| 225        | 35218    | 35238           | 35257         | 35276         | 35295  | 35315 | 35334  | 35353         | 35372         | 35392 |
| 226        | 35411    | 35430           | 35449         | 35 <b>468</b> | 35488  | 35507 | 35526  | 35545         | 35564         | 35583 |
| 227        | 35608    | 35622           | 35641         | 35660         | 35679  | 35698 | 35717  | 35736         | 35755         | 35774 |
| 228        | 35793    | 35813           | 35832         | 35851         | 95870  | 35889 | 35908  | 35927         | 35946         | 35965 |
| 229        | 35984    | 36003           | 36021         | 36040         | 36059  | 36078 | 36097  | 36116         | 36135         | 36154 |
| 230        | 36173    | 36192           | 36211         | 36229         | 36248  | 36267 | 36286  | 36305         | 36324         | 36342 |
| 231        | 36361    | 36380           | 36399         | 36418         | 36436  | 36455 | 36474  | <b>364</b> 93 | 36511         | 36530 |
| 232        | 36549    | 36568           | 36586         | 36605         | 36624  | 36642 | 36661  | 36680         | 36698         | 36717 |
| 233        | 36736    | 36754           | 36773         | 36791         | 36810  | 36829 | 36847  | 36866         | 36884         | 36903 |
| 234        | 36922    | 36940           | 36959         | 36977         | 36996  | 37014 | 37033  | 37051         | 37070         | 37088 |
| 235        | 37107    | 37125           | 37144         | 37162         | 37181  | 37199 | 37218  | 37236         | 37254         | 37273 |
| 236        | 37291    | 37310           | 37328         | <b>37346</b>  | 37365  | 37383 | 37401  | .87420        | 37438         | 37457 |
| 237        | 37475    | 37493           | 37511         | 37530         | 37548  | 37566 | 37585  | 37603         | 37621         | 37639 |
| 238        | 37658    | 37676           | 37694         | 37712         | 37731  | 37749 | 37767  | 37785         | 37803         | 37822 |
| 239        | 37840    | 37858           | 37876         | 37894         | 37912  | 37931 | 37949  | 37967         | 37985         | 38003 |
| 240        | 38021    | 38089           | 38057         | 38075         | 38093  | 38112 | 38130  | 38148         | 38166         | 38184 |
| 241        | 38202    | 38220           | <b>382</b> 38 | 38256         | 38274  | 38292 | 38310  | 38328         | 38346         | 38364 |
| 242        | 38382    | 38399           | 38417         | 38435         | 38453  | 38471 | 38489  | 38507         | 38525         | 38543 |
| 243        | 38561    | 38578           | 38596         | 38614         | 38632  | 38650 | 38C68  | 38686         | 38703         | 38721 |
| 244        | 38739    | 38757           | 38775         | 38792         | 38810  | 38828 | 38846  | 88863         | 38881         | 38899 |
| 245        | 38917    | 38934           | 38952         | 38970         | 38987  | 89005 | 39023  | 39041         | 39058         | 39076 |
| 246        | 39094    | 39111           | 39129         | 39146         | 39164  | 39182 | 39199  | 39217         | 39235         | 39252 |
| 247        | 39270    | 39287           | 39305         | 59322         | 39340  | 39358 | 39375  | 39393         | 39410         | 39428 |
| 248        | 39445    | 39463           | 39480         | 39498         | 39515  | 39533 | 39550  | 39568         | 39585         | 39602 |
| 249        | 39620    | 39637           | 39655         | 39672         | 39690  | 39707 | 39724  | 39742         | 39759         | 39777 |
| 250        | 39794    | 39811           | 39829         | 39846         | 39863  | 39881 | 39898  | 39915         | 39933         | 39950 |
| 251        | 39967    | 39985           | 40002         | 40019         | 40037  | 40054 | 40071  | 40088         | 40106         | 40123 |
| 252        | 40140    | 40157           | 40175         | 40192         | 40209  | 40226 | 40243  | 40261         | 40278         | 40295 |
| 253        | 40312    | 40329           | 40346         | 40364         | 40381  | 40398 | 40415  | 40432         | 40449         | 40466 |
| 254        | 40483    | 40500           | 40518         | 40535         | 40552  | 40569 | 40586  | 40603         | 40620         | 40637 |
| <b>255</b> | 40654    | 40671           | 40688         | 40705         | 40722  | 40739 | 40756  | 40773         | 40790         | 40807 |
| 256        | 40824    | 40841           | 40858         | 40875         | 40892  | 40909 | 40926  | 40943         | 40960         | 40976 |
| 257        | 40993    | 41010           | 41027         | 41044         | 41061  | 41078 | 41095  | 41111         | 41128         | 41145 |
| 258        | 41162    | 41179           | 41196         | 41212         | 41229  | 41246 | 41263  | 41280         | 41296         | 41313 |
| 259        | 41330    | 41947           | 41363         | 41380         | 41397  | 41414 | 41430  | 41447         | 41464         | 41481 |
| 260        | 41497    | 41514           | 41581         | 41547         | 41564  | 41581 | 41597  | 41614         | 41691         | 41647 |
| 261        | 41664    | 41681           | 41697         | 41714         | 41731  | 41747 | 41764  | 41780         | 41797         | 41814 |
| 262        | 41890    | 41847           | 41863         | 41880         | 41896  | 41913 | 41929  | 41946         | 41963         | 41979 |
| 263        | 41996    | 42012           | 42029         | 42045         | 42062  | 42078 | 42095  | 42111         | 42127         | 42144 |
| 264        | 42160    | 42177           | £2193         | 42210         | 42226  | 42248 | 42259  | 42275         | 42292         | 42308 |
| 265        | 42325    | 42341           |               | 42374         | 42390  | 42406 | 42423  | 42439         | 42455         | 42472 |
| 266        | 42488    | 42504           | 42521         | 42537         | 42558  | 42570 | 42586  | 42602         | 42619         | 42635 |
| 267        | 42651    | 42667           | 42684         | 42700         | 42716  | 42732 | 42749  | 42765         | 42781         | 42797 |
| 268        | 42813    | 42830           | 42846         | 42862         | 42878  | 42894 | 42911  | 42927         | 42943         | 42959 |
| 269        | 42975    | 42991           | 43008         | 43024         | 48040  | 43056 | 43072  | 43088         | 43104         | 48120 |
| 270        | 48136    | 43152           | 43169         | 49185         | 43201  | 43217 | 43233  | 43249         | 43265         | 43281 |
| 271        | 49297    | 49313           | 43329         | 43345         | 43361  | 43377 | 43393  | 43409         | 49425         | 43441 |
| 272        | 43457    | 49473           | 43489         | 43505         | 43521  | 43537 | 43558  | 49569         | 43684         | 43600 |
| 273        | 43616    | 43032           | 43648         | 43664         | 43680  | 43696 | 43712  | 43727         | 49743         | 43759 |
| 274        | 43775    | 43791           | 43807         | 49823         | 498\$8 | 43854 | 43870  | 43886         | 43902         | 43917 |
| 275        | 43933    | 43949           | 43965         | 43981         | 43996  | 44012 | 44028  | 44044         | 44059         | 44075 |
| 276        | 44091    | 44107           | 44122         | 44198         | 44154  | 44170 | 44185  | 44201         | 44217         | 44232 |
| 277        | 41248    | 44264           | 44279         | 44295         | 44311  | 44326 | 44342  | 44358         | 44373         | 44389 |
| 278        | 24104    | 44420           | 44436         | 44451         | 44467  | 44483 | 44498  | 44514         | 44529         | 44545 |
| 279        | 44560    | j <b>445</b> 76 | 44592         | 44607         | 44625  | 44638 | 44654  | 44669         | 44685         | 44700 |
|            | 0        | 1               | 2             | 8             | 4      | 5     | 6      | 7             | 8             | 9     |
| *          |          |                 |               |               |        |       |        |               |               |       |

TABLE VIII.

| No. 28003400 |                |                |                |                |                |                | Log. 4471658148 |                  |                |                       |
|--------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|------------------|----------------|-----------------------|
| No.          | 0              | 1              | 2              | 3              | 4              | 5              | 6               | 7                | 8              | 9                     |
| 280          | 44716          | 44731          | 44747          | 44762          | 44778          | 44793          | 44809           | 44894            | 44840          | 44855                 |
| 281          | 44871          | 44886          | 44902          | 44917          | 44932          | 44948          | 44963           | 44979            | 44994          | 45010                 |
| 282<br>283   | 45025          | 45040          | 45056          | 45071          | 45086          | 45102          | 45117           | 45133            | 45148          | 45163                 |
| 284          | 45179<br>45332 | 45194<br>45347 | 45209<br>45362 | 45225<br>45378 | 45240<br>45393 | 45255<br>45408 | 45271<br>45423  | 45286<br>45439   | 45301<br>45454 | 45317<br>45469        |
| 285          | 45484          | 45500          | 45515          | 45530          | 45545          | 45561          | 45576           | 45591            | 45606          | 45621                 |
| 286          | 45697          | 45652          | 45667          | 45682          | 45697          | 45712          | 45728           | 45748            | 45758          | 45779                 |
| 287          | 45788          | 45803          | 45818          | 45834          | 45849          | 45864          | 45879           | 45894            | 45909          | 45924                 |
| 288          | 45939          | 45954          | 45969          | 45984          | 46000          | 46015          | 46030           | 46045            | 46060          | 46075                 |
| 289          | 46090          | 46105          | 46120          | 46135          | 46150          | 46165          | 46180           | 46195            | 46210          | 46225                 |
| 290          | 46240          | 46255          | 46270          | 46285          | 46300          | 46315          | 46330           | 46345            | 46359          | 46374                 |
| 291          | 46389          | 46404          | 46419          | 46494          | 46449          | 46464          | 46479           | 46494            | 46509          | 46523                 |
| 292          | 46538          | 46553          | 46568          | 46589          | 46598          | 46613          | 46627           | 46642            | 46657          | 46672                 |
| 293<br>294   | 46687<br>46835 | 46702<br>46850 | 46716<br>46864 | 46731<br>46879 | 46746<br>46894 | 46761<br>46909 | 46776<br>46923  | 46790<br>46938   | 46805<br>46953 | 46820<br>46967        |
| 295          | 46982          | 46997          | 47012          | 47026          | 47041          | 47056          | 47070           | 47085            | 47100          | 47114                 |
| 296          | 47129          | 47144          | 47159          | 47173          | 47188          | 47202          | 47217           | 47232            | 47246          | 47261                 |
| 297          | 47276          | 47290          | 47305          | 47319          | 47334          | 47349          | 47363           | 47378            | 47392          | 47407                 |
| 298          | 47422          | 47436          | 47451          | 47465          | 47480          | 47494          | 47509           | 47524            | 47538          | 47553                 |
| 299          | 47567          | 47582          | 47596          | 47611          | 47625          | 47640          | 47654           | 47669            | 47689          | 47698                 |
| 300          | 47712          | 47727          | 47741          | 47756          | 47770          | 47784          | 47799           | 47813            | 47828          | 47842                 |
| 301          | 47857          | 47871          | 47885          | 47900          | 47914          | 47929          | 47943           | 47958            | 47972          | 47986                 |
| 502          | 48001          | 48015          | 48029          | 48044          | 48058          | 48073          | 48087           | 48101            | 48116          | 48130                 |
| 303          | 48144          | 48159          | 48173          | 48187          | 48202          | 48216          | 48230           | 48244            | 48259          | 48273                 |
| 804<br>805   | 48287<br>48430 | 48302<br>48444 | 48316<br>48458 | 48330<br>48473 | 48344<br>48487 | 48359<br>48501 | 48373<br>48515  | 48387<br>48530   | 48401<br>48544 | 48416<br>48558        |
| 306          | 48572          | 48586          | 48601          | 48615          | 48629          | 48643          | 48657           | 48671            | 48686          | 48700                 |
| 307          | 48714          | 48728          | 48742          | 48756          | 48770          | 48785          | 48799           | 48813            | 48827          | 48841                 |
| 308          | 48855          | 48869          | 48883          | 48897          | 48911          | 48926          | 48940           | 48954            | 48968          | 48982                 |
| 309          | 48996          | 49010          | 49024          | 49038          | 49052          | 49066          | 49080           | 49094            | 49108          | 49122                 |
| 310          | 49136          | 49150          | 49164          | 49178          | 49192          | 49206          | 49220           | 49234            | 49248          | 49262                 |
| 311          | 49276          | 49290          | 49304          | 49318          | 49332          | 49346          | 49360           | 49374            | 49388          | 49402                 |
| 312          | 49415<br>49554 | 49429<br>49568 | 49443<br>49582 | 49457<br>49596 | 49471          | 49485          | 49499<br>49638  | . 49513<br>49651 | 49527<br>49665 | 49541<br>49679        |
| 313<br>314   | 49693          | 49707          | 49721          | 49734          | 49610<br>49748 | 49624<br>49762 | 49776           | 49651            | 49803          | 49679<br>49817        |
| 315          | 49831          | 49845          | 49859          | 49872          | 49886          | 49900          | 49914           | 49927            | 49941          | 49955                 |
| 316          | 49969          | 49982          | 49996          | 50010          | 50024          | 50037          | 50051           | 50065            | 50079          | 50092                 |
| 317          | 50106          | 50120          | 50133          | 50147          | 50161          | 50174          | 50188           | 50202            | 50215          | 50229                 |
| 318          | 50243          | 50256          | <b>5</b> 0270  | 50284          | 50297          | 50311          | 50325           | 50338            | 50352          | <b>5</b> 036 <b>5</b> |
| 319          | 50379          | 50398          | 50406          | 50420          | 50433          | 50447          | <i>5</i> 0461   | 50474            | 50488          | 50501                 |
| 320          | 50515          | 50529          | 50542          | 50556          | 50569          | 50583          | 50596           | 50610            | 50623          | 50637                 |
| 821<br>922   | 50651<br>50786 | 50664<br>50799 | 50678<br>50813 | 50691<br>50826 | 50705<br>50840 | 50718<br>50853 | 50732<br>50866  | 50745<br>50880   | 50759<br>50893 | 50772<br>50907        |
| 323          | 50920          | 50199          | 50947          | 50961          | 50974          | 50987          | 51001           | 51014            | 51028          | 51041                 |
| 324          | 51055          | 51068          | 51081          | 51095          | 51108          | 51121          | 51135           | 51148            | 51162          | 51175                 |
| 325          | 51188          | 51202          | 51215          | 51228          | 51242          | 51255          | 51268           | 51282            | 51295          | 51308                 |
| 326          | 51322          | 51335          | 51348          | 51362          | 51375          | 51388          | 51402           | 51415            | 51428          | 51441                 |
| 327          | 51455          | 51468          | 51481          | 51495          | 51508          | 51521          | 51534           | 51548            | 51561          | 51574                 |
| 328          | 51587          | 51601<br>51733 | 51614<br>51746 | 51627<br>51759 | 51640          | 51654          | 51667<br>51799  | 51680<br>51812   | 51693<br>51825 | 51706                 |
| 329          | 51720          | .!             |                |                | 51772          | 51786          |                 |                  |                | 51888                 |
| 330          | 51851          | 51865          | 51878          | 51891          | 51904          | 51917          | 51930           | 51948            | 51957          | 51970                 |
| 931<br>332   | 51983<br>52114 | 51996<br>52127 | 52009<br>52140 | 52022<br>52153 | 52035<br>52166 | 52048<br>52179 | 52061<br>52192  | 52075<br>52205   | 52088<br>52218 | 52101                 |
| 333          | 52244          | 52257          | 52270          | 52284          | 52297          | 52179          | 52192           | 52336            | 52349          | 52231<br>52362        |
| 334          | 52375          | 52388          | 52401          | 52414          | 52427          | 52440          | 52453           | 52466            | 52479          | 52302<br>52492        |
| 335          | 52504          | 52517          | 52530          | 52543          | 52556          | 52569          | 52582           | 52595            | 52608          | 52621                 |
| 836          | 52634          | 52647          | 52660          | 52673          | 52686          | 52699          | 52711           | 52724            | 52737          | -52750                |
| 337          | 52763          | 52776          | 52789          | 52802          | 52815          | 52827          | 52840           | 52853            | 52866          | 52879                 |
| 538          | 52892          | 52905          | 52017          | 52930          | 52943          | 52956          | <b>52969</b>    | 52982            | 52994          | 53007                 |
| 339          | 53020          | 53033          | 53046          | 53058          | 53071          | 53084          | 53097           | 53110            | 58122          | 581 <b>3</b> 5        |

TABLE VIII.
LOGARITHMS OF NUMBERS.

| No. 94004000        |                |                |                |                    |                       | Log. 53148      |                        | 60206          |                       |                            |
|---------------------|----------------|----------------|----------------|--------------------|-----------------------|-----------------|------------------------|----------------|-----------------------|----------------------------|
| No.                 | 0              | 1              | 2              | 3                  | 4                     | 5               | 6                      | 7.             | 8                     | 9                          |
| 340                 | 53148          | 53161          | 53173          | 53186              | 53199                 | 59212           | 53224                  | 53237          | 53250                 | 53263                      |
| 341                 | 58275          | 53288          | 53301          | 53314              | 53326                 | 53339           | 53352                  | 53364          | 58977                 | 53390                      |
| 342                 | 53403          | 59415          | 59428          | 59441              | 53453                 | 58466           | 53479                  | 59491          | 53504                 | 59517                      |
| 343                 | 53529          | 53542          | 59555          | 5 <del>95</del> 67 | 53580                 | <i>8</i> 3599   | 53605                  | 53618          | 53631                 | 53643                      |
| 944                 | 53656          | 59668          | 59681          | 53694              | 53706                 | 53719           | 58732                  | 58744          | 53757                 | 53769                      |
| 345                 | 53782          | 53794          | 53807          | 53820              | 53832                 | 58845           | 53857                  | 53870          | 58882                 | 53895                      |
| 346                 | 53908          | 53920          | <i>5</i> 3939  | 53945              | <i>5</i> 3958         | 539 <b>70</b> - | <i>5</i> 3983          | 53995          | 54008                 | 54020                      |
| 347                 | 54033          | 54045          | 54058          | 54070              | <i>5</i> 4083         | 54095           | 54108                  | 54120          | 54139                 | 54145                      |
| 348                 | 541 <i>5</i> 8 | 54170          | <i>5</i> 4183  | 54195              | 54208                 | 54220           | <i>5</i> 4233          | 54245          | 54258                 | <i>5427</i> 0              |
| 349                 | 54283          | 54295          | 54307          | 54320              | 54332                 | 54345           | 54357                  | 54370          | 54382                 | 54394                      |
| 350                 | 54407          | 54419          | 54432          | 54444              | 54456                 | <b>644</b> 69   | 54481                  | 54494          | 54506                 | 54518                      |
| 351                 | 54531          | 54543          | 54555          | 54568              | 54580                 | 54593           | 54605                  | 54617          | 54630                 | 54642                      |
| 352                 | 54654          | 54667          | 54679          | 54691              | 54704                 | 54716           | 54728                  | 54741          | 54758                 | 54765                      |
| 353                 | 54777          | 54790          | 54802          | 54814              | 54827                 | 54839           | 54851                  | 54864          | 54876                 | 54888                      |
| 354                 | 54900          | 54913          | 54925          | 54937              | 54949                 | 54962           | 54974                  | 54986<br>55108 | 54998                 | 55011                      |
| . 355               | 55023          | 55035          | 55047          | 55060              | 55072                 | 55084           | 55096                  | 55230          | 55121                 | 55133                      |
| 356                 | 55145          | 55157<br>55279 | 55169<br>55291 | 55182<br>55303     | 55194<br>55315        | 55206<br>55328  | 55218<br>553 <b>40</b> | 55352          | 55242<br>55364        | 55255<br>55276             |
| 357                 | 55267<br>55388 | 55400          | 55413          | 55425              | 55437                 | 55449           | 55461                  | 55473          | 55485                 | 55376<br>55497             |
| 358<br>359          | 55509          | 55522          | 55534          | 55546              | 55558                 | 55570           | 5558 <b>2</b>          | 55594          | 55606                 | 55618                      |
| 360                 | 55630          | 55642          | 55654          | 55666              | 55678                 | 55691           | 55703                  | 55715          | 55727                 | 55739                      |
| 861                 | 55751          | <i>5</i> 5763  | 55775          | 55787              | 55799                 | 55811           | 55823                  | 55835          | 55847                 | 55859                      |
| 362                 | 55871          | 55883          | 55895          | 55907              | 5591 <b>9</b>         | 55931           | 55943                  | 55955          | 55967                 | 55979                      |
| <b>\$</b> 63        | 55991          | 56003          | 56015          | 56027              | 56038                 | 56050           | 56062                  | 56074          | 56086                 | 56098                      |
| 364                 | 56110          | 56122          | 56134          | 56146              | 56158                 | 56170.          | 56182                  | 56194          | 56205                 | 56217                      |
| <b>3</b> 6 <i>5</i> | 56229          | 56241          | 56253          | 56265              | 56277                 | 56289           | 56301                  | 56312          | 56324                 | 56356                      |
| <b>366</b> .        | 56348          | <i>5</i> 6360  | 56372          | 56384              | 56396                 | 56407           | 56419                  | 56431          | 56443                 | 56455                      |
| 367                 | 56467          | 56478          | 56490          | 56502              | 56514                 | 56526           | <i>5</i> 6538          | 56549          | 56561                 | 56573                      |
| 368                 | 56585          | 56597          | 56608          | 56620              | 56632                 | 56644           | <i>5</i> 6656          | 56667          | 56679                 | <b>56</b> 691              |
| 369                 | 56708          | 56714          | 56726          | <i>5</i> 6738      | <b>5</b> 67 <b>50</b> | 56761           | 56773                  | 56785          | 56797                 | 56808                      |
| 370                 | 56820          | 56832          | 56844          | 56855              | 56867                 | 56879           | 56891                  | 56902          | 56914                 | 56926                      |
| 371                 | 56937          | 56949          | 56961          | 56972              | 56984                 | 56996           | 57008                  | 57019          | 5703 <b>1</b>         | 57049                      |
| 372                 | 57054          | 57066          | 57078          | 57089              | 57101                 | 57113           | 57124                  | 57136          | 57148                 | 57159                      |
| <b>3</b> 73         | 57171          | <i>5</i> 7183  | 57194          | 57206              | 57217                 | 57229           | 57241                  | 57252          | 57264                 | 57276                      |
| 374                 | 57287          | <b>5</b> 7299  | 57310          | 57322              | 57334                 | 57345           | <i>5</i> 73 <i>5</i> 7 | 57368          | 57380                 | 5739 <b>2</b>              |
| 875                 | 5740ß          | 57415          | 57426          | 57438              | <i>5</i> 7449         | 57461           | 57473                  | 57484          | 57496                 | <i>5750</i> 7              |
| 376                 | 57519          | <i>575</i> 30  | 57542          | 57553              | 57565                 | 57576           | <i>5</i> 7 <i>5</i> 88 | 57600          | 57611                 | 57623                      |
| <b>377</b>          | <i>5</i> 7634  | 57646          | 57657          | 57669              | 57680                 | 57692           | 57703                  | 57715          | 57726                 | 57738                      |
| 378                 | 57749          | 57761          | 57772          | 57784              | 57795                 | 57807           | 57818                  | 57830          | 57841                 | 57852                      |
| 979                 | 57864          | 57875          | 57887          | 57898              | 57910                 | 57921           | 57933                  | 57944          | 57955                 | 57967                      |
| 380                 | 57978          | 57990          | 58001          | 58013              | 58024                 | 58035           | 58047                  | 58058          | 5807O                 | 58081                      |
| 381                 | 58092          | 58104          | 58115          | 58127              | <i>5</i> 8138         | 58149           | <i>5</i> 8161          | 58172          | <i>5</i> 818 <b>4</b> | - 58195                    |
| 382                 | 58206          | 58218          | 58229          | 58240              | 58252                 | 58263           | 58274                  | 58286          | 58297                 | 58309                      |
| . 383               | 58320          | 58331          | 58343          | 58354              | 58365                 | 58377           | 58388                  | 58399          | 58410                 | 58422                      |
| 984                 | 58433          | 58444          | 58456          | 58467              | 58478                 | 58490           | 58501                  | 58512          | 58524                 | 58535                      |
| 38 <i>5</i>         | 58546          | 58557          | 58569          | 58580              | 58591                 | 58602           | 58614                  | 58625          | 58636                 | 58647                      |
| 386                 | 58659          | 58670          | 58681          | 58692              | 58704                 | 58715           | 58726                  | 58737          | 58749                 | 58760                      |
| 387                 | 58771          | 58782          | 58794          | 58805              | 58816                 | 58827           | 58838                  | 58850          | 58861                 | 58872                      |
| 388<br>389          | 58883<br>58995 | 58894<br>59006 | 58906<br>59017 | 58917<br>59028     | 58928<br>59040        | 58939<br>59051  | 58950<br>59062         | 58961<br>59073 | 58973<br>59084        | 589 <del>84</del><br>59095 |
|                     | !              |                |                | 59140              |                       |                 | 59173                  |                |                       |                            |
| 390                 | 59106          | 59118          | 59129<br>59240 | 59251              | 59151                 | 59162           | 59178<br>5928 <b>4</b> | 59184<br>59295 | 59195<br>50906        | 59207                      |
| 391<br><b>3</b> 92  | 59218<br>59329 | 59229<br>59340 | 59351          | 59362              | 59262<br>59373        | 59273<br>59384  | 59395                  | 59295<br>59406 | 59306<br>59417        | 59318<br>59428             |
| 392<br>393          | 59329<br>59489 | 59340<br>59450 | 59351<br>59461 | 59302<br>59472     | 59373<br>59483        | 59384           | 59595<br>59506         | 59406<br>59517 | 59528                 | 59539                      |
| 595<br>594          | 59550          | 59561          | 59572          | 59583              | 59594                 | 59605           | 59616                  | 59627          | 59638                 | 59649                      |
| 395                 | 59660          | 59671          | 59682          | 59693              | 59704                 | 59715           | 5972 <b>6</b>          | 59737          | 59748                 | 59759                      |
| 396                 | 59770          | 59780          | 59791          | 59802              | 99813                 | 59824           | 59835                  | 59846          | 59857                 | 59868                      |
| 397                 | 59879          | 59890          | 59901          | 59912              | 59923                 | 59934           | 59945                  | <i>5</i> 9956  | 59966                 | 59977                      |
| 398                 | 59988          | 59999          | 60010          | 60021              | 60032                 | 60043           | 600.54                 | 60065          | 60076                 | 60086                      |
| 399                 | 60097          | 60108          | 60119          | 60130              | 60141                 | 60152           | 60163                  | 60173          | 60184                 | 60195                      |
|                     | 0              | - 1            | 2              | 3                  | 4                     | 5               | 6                      | 7              | 8                     | 9                          |
|                     |                |                |                | ·                  | ····                  |                 |                        | <u>_</u>       |                       |                            |

TABLE VIII.

| No. 4000——4600 Log. 60206——66276 |                |                |                            |                |                |                |                | ,                      |                |                                  |
|----------------------------------|----------------|----------------|----------------------------|----------------|----------------|----------------|----------------|------------------------|----------------|----------------------------------|
| No.                              | 0              | 1 .            | 2                          | 8              | 4              | 5              | 6              | 7                      | 8              | 9 ,                              |
| 400                              | 60206          | 60217          | 60228                      | 60239          | 60249          | 60260          | 60271          | 60282                  | 60293          | 60804                            |
| 401                              | 60314          | 60325          | 60336                      | 60347          | 60358          | 60369          | 60379          | 60390                  | 60401          | 60412                            |
| 402                              | 60429          | 60433          | 60444                      | 60455          | 60466          | 60477          | 60487          | 60498                  | 60509          | 60520                            |
| 403<br>404                       | 60531          | 60541<br>60649 | 60552<br>60660             | 60563<br>60670 | 60574<br>60681 | 60584<br>60692 | 60595<br>60703 | 60606<br>60713         | 60617<br>60724 | 60627                            |
| 405                              | 60638<br>60746 | 60756          | 60767                      | 60778          | 60788          | 60799          | 60810          | 60821                  | 60831          | 607 <b>3</b> 5<br>60842          |
| 406                              | 60853          | 60868          | 60874                      | 60885          | 60895          | 60906          | 60917          | 60927                  | 60938          | 60949                            |
| 407                              | 60959          | 60970          | 60981                      | 60991          | 61002          | 61013          | 61023          | 61034                  | 61045          | 61055                            |
| 408                              | 61066          | 61077          | 61087                      | 61098          | 61109          | 61119          | 61190          | 61140                  | 61151          | 61162                            |
| 409                              | 61172          | 61183          | 61194                      | 61204          | 61215          | 61225          | 61236          | 61247                  | 61257          | 61268                            |
| 410                              | 61278          | 61289          | 61300                      | 61310          | 61321          | 61331          | 61342          | 61352                  | 61363          | 61374                            |
| 411                              | 61384          | 61395          | 61405                      | 61416          | 61426          | 61437          | 61448          | 61458                  | 61469          | 61479                            |
| 412                              | 61490          | 61500          | 61511                      | 61521          | 61532          | 61542          | 61553          | 61563                  | 61574          | 61584                            |
| 413                              | 61595          | 61606          | 61616                      | 61627          | 61637<br>61742 | 61648<br>61752 | 61658          | 61669                  | 61679          | 61690                            |
| 414                              | 61700<br>61805 | 61711<br>61815 | 61721<br>61826             | 61731<br>61836 | 61847          | 61857          | 61763<br>61868 | 6177 <b>3</b><br>61878 | 61784          | 61794                            |
| 416                              | 61909          | 61920          | 61930                      | 61941          | 61951          | 61962          | 61972          | 61982                  | 61888<br>61993 | 61899<br>62003                   |
| 417                              | 62014          | 62024          | 62034                      | 62045          | 62055          | 62066          | 62076          | 62086                  | 62097          | 62107                            |
| 418                              | 62118          | 62128          | 62138                      | 62149          | 62159          | 62170          | 62180          | 62190                  | 62201          | 62211                            |
| 419                              | 62221          | 62232          | 62242                      | 62252          | 62263          | 62275          | 62284          | 62294                  | 62304          | 62815                            |
| 420                              | 62325          | 62335          | 62346                      | 62356          | 62366          | 62377          | 62387          | 62397                  | 62408          | 62418                            |
| 421                              | 62428          | 62439          | 62449                      | 62469          | 62469          | 62480          | 62490          | 62500                  | 62511          | 62521                            |
| 422                              | 62531          | 62542          | 62552                      | 62562          | 62572          | 62583          | 62598          | 62603                  | 62613          | 62624                            |
| 423                              | 62634          | 62644          | 62655                      | 62665          | 62675          | 62685          | 62696          | 62706                  | 62716          | 62726                            |
| 424                              | 62797          | 62747          | 62757                      | 62767          | 62778          | 62788          | 62798          | 62808                  | 62818          | 62829                            |
| 425<br>426                       | 62839          | 62849          | 62859                      | 62870          | 62880<br>62982 | 62890<br>62992 | 62900          | 62910                  | 62921          | 62931                            |
| 427                              | 62941<br>63043 | 62951<br>63053 | 62961<br>6306 <b>3</b>     | 62972          | 63083          | 63094          | 63104          | 69012<br>69114         | 63022<br>63124 | 63033                            |
| 428                              | 63144          | 63155          | 63165                      | 69175          | 63185          | 63195          | 63205          | 63215                  | 63225          | 6 <b>31</b> 34<br>63 <b>2</b> 36 |
| 429                              | 63246          | 63256          | 63266                      | 63276          | 63286          | 63296          | 63306          | 63317                  | 63327          | 63337                            |
| 430                              | 68347          | 68357          | 63367                      | 69377          | 63387          | 63397          | 63407          | 63417                  | 69428          | 63438                            |
| 431                              | 63448          | 69458          | 63468                      | 63478          | 63488          | 63498          | 63 <i>5</i> 08 | 63518                  | 63528          | 63538                            |
| 432                              | 63548          | 63558          | 63568                      | 63579          | 63589          | 63599          | 63609          | 63619                  | 63629          | 63639                            |
| 433                              | 63649          | 63659          | 63669                      | 63679          | 69689          | 63699          | 63709          | 63719                  | 63729          | 63739                            |
| 434                              | 63749          | 63759          | 63769                      | 63779          | 63789          | 63799          | 63809          | 63819                  | 63829          | 63839                            |
| 435<br>436                       | 63849          | 63859<br>63959 | 63869                      | 63879<br>63979 | 63889<br>63988 | 63899<br>63998 | 63909          | 63919                  | 63929          | 63939                            |
| 437                              | 63949<br>64048 | 64058          | 63969<br>64068             | 64078          | 64088          | 64098          | 64008<br>64108 | 64018<br>64118         | 64028<br>64128 | 64038                            |
| 438                              | 64147          | 64157          | 64167                      | 64177          | 64187          | 64197          | 64207          | 64217                  | 64227          | 64137<br>64237                   |
| 439                              | 64246          | 64256          | 64266                      | 64276          | 64286          | 64296          | 64306          | 64316                  | 64326          | 64335                            |
| 440                              | 64945          | 64355          | 64365                      | 64375          | 64385          | 64395          | 64404          | 64414                  | 64424          | 64434                            |
| 441                              | 64444          | 64454          | 64464                      | 64473          | 64489          | 64493          | 64503          | 64513                  | 64523          | 64532                            |
| 442                              | 64542          | 64552          | 64562                      | 64572          | 64582          | 64591          | 64601          | 64611                  | 64621          | 64631                            |
| 443                              | 64640          | 64650          | 64660                      | 64670          | 64680          | 64689          | 64699          | 64709                  | 64719          | 64729                            |
| 444                              | 64738          | 64748          | 64758                      | 64768          | 64777          | 64787          | 64797          | 64807                  | 64816          | 64826                            |
| 445                              | 64836          | 64846          | 64856                      | 64865          | 64875          | 64885          | 64895          | 64904                  | 64914          | 64924                            |
| 446                              | 64933          | 64943          | 64953                      | 64969          | 64972          | 64982          | 64992          | 65002                  | 65011          | 65021                            |
| 447<br>448                       | 65031          | 65040          | 65050<br>65147             | 65060          | 65070<br>65167 | 65079          | 65089          | 65099                  | 65108          | 65118                            |
| 449                              | 65128<br>65225 | 65137<br>65234 | 65244                      | 65157<br>65254 | 65263          | 65176<br>65278 | 65186<br>65283 | 65196<br>65292         | 65205<br>65302 | 65215<br>65312                   |
| 450                              | 65821          | 65331          | 65341                      | 65350          | 65360          | 65369          | 65379          | <del></del>            |                |                                  |
| 451                              | 65418          | 65427          | 65437                      | 65447          | 65456          | 65466          | 65475          | 65389.<br>65485        | 65398<br>65495 | 65408<br>65504                   |
| 452                              | 65514          | 65523          | 65533                      | 65548          | 65552          | 65562          | 65571          | 65581                  | 65591          | 65600                            |
| 453                              | 65610          | 65619          | 65629                      | 65639          | 65648          | 65658          | 65667          | 65677                  | 65686          | 65696                            |
| 454                              | 65706          | 65715          | 65725                      | 65734          | 65744          | 65753          | 65763          | 65772                  | 65782          | 65792                            |
| 455                              | 65801          | 65811          | 65820                      | 65830          | 65839          | 65849          | 65858          | 65868                  | 65877          | 65887                            |
| 456                              | 65896          | 65906          | 65916                      | 65925          | 6593 <b>5</b>  | 65944          | 65954          | 65963                  | 65973          | 65982                            |
| 457                              | 65992          | 66001          | 66011                      | 66020          | 66030          | 66039          | 66049          | 66058                  | 66068          | 66077                            |
| 458<br>459                       | 66087          | 66096          | 6610 <del>6</del><br>66200 | 66115          | 66194<br>66219 | 66134          | 66143          | 66153                  | 66162          | 66172                            |
| 105                              |                | 00191          | 00200                      | 60210          | 00219          | 66229          | 66238          | 66247                  | 66257          | 66266                            |
| •                                | 1 7            |                | • ^                        | . ~            |                |                | ~              |                        |                |                                  |

TABLE VIII.
LOGARITHMS OF NUMBERS.

| No. 46005200               |                |                |                |                | Log. 6627671600         |                            |                        |                        |  |                |  |
|----------------------------|----------------|----------------|----------------|----------------|-------------------------|----------------------------|------------------------|------------------------|--|----------------|--|
| No.                        | 0              | 1              | 2              | 3              | 4                       | 5                          | 6                      | 7                      | 8                                      | 9              |  |
| 460                        | 66276          | 66285          | 66295          | 66904          | 66314                   | 66323                      | 66332                  | 66342                  | 66351                                  | 66361          |  |
| 461                        | 66370          | 66380          | 66389          | 66398          | 66408                   | 66417                      | 66427                  | 66436                  | 66445                                  | 66455          |  |
| . 462                      | 66464          | 66474          | 66483          | 66492<br>66586 | 66502<br>66596          | 66511                      | 66521<br>66614         | 66530<br>66624         | 66539                                  | 66549          |  |
| 463<br>464                 | 66558<br>66652 | 66567<br>66661 | 66577<br>66671 | 66680          | 66689                   | 66699                      | 66708                  | 66717                  | 66633<br>66727                         | 66642<br>66736 |  |
| 465                        | 66745          | 66755          | 66764          | 66773          | 66783                   | 66792                      | 66801                  | 66811                  | 66820                                  | 66829          |  |
| 466                        | 66839          | 66848          | 66857          | 66867          | 66876                   | 66885                      | 66894                  | 66904                  | 66918                                  | 66922          |  |
| 467                        | 66932          | 66941          | 66950          | 66960          | 66969                   | 66978                      | 66987                  | 66997                  | 67006                                  | 67015          |  |
| 468                        | 67025          | 67034          | 67043          | 67052          | 67062                   | 67071                      | 67080                  | -67089                 | 67099                                  | 67108          |  |
| 469                        | 67117          | 67127          | 67136          | 67145          | 67154                   | 67164                      | 67173                  | 67182                  | 6719ł                                  | 67901          |  |
| 470                        | 67210          | 67219          | 67228          | 67237          | 67247                   | 67256                      | 67265                  | 67274                  | 67284                                  | 67293          |  |
| 471                        | 67302          | 67311          | 67821          | 67330          | 67339                   | 67348                      | 67357                  | 67367                  | 67876                                  | 67385          |  |
| 472                        | 67394          | 67403          | 67413          | 67422          | 67431                   | 67440                      | 67449                  | 67459                  | 67468                                  | 67477          |  |
| 478                        | 67486          | 67495          | 67504          | 67514          | 67523                   | 67532                      | 67541                  | 67550                  | 67560                                  | 67569          |  |
| 474                        | 67578          | 67587          | 67596          | 67605          | 67614                   | 67624                      | 67633                  | 67642                  | 67651                                  | 67660          |  |
| 475                        | 67669          | 67679          | 67688          | 67697<br>67788 | 67706<br>67797          | 6771 <i>5</i><br>67806     | 67724<br>67815         | 67733<br>67825         | 67742<br>67834                         | 67752          |  |
| 476<br>477                 | 67761          | 67770<br>67861 | 67779<br>67870 | 67879          | 67888                   | 67897                      | 67906                  | 67916                  | 67925                                  | 67843<br>67934 |  |
| 478                        | 67852<br>67943 | 67952          | 67961          | 67970          | 67979                   | 67988                      | 67997                  | 68006                  | 68015                                  | 68024          |  |
| 479                        | 68034          | 68043          | 68052          | 68061          | 68070                   | 68079                      | 68088                  | 68097                  | 68106                                  | 68115          |  |
| 480                        | 68124          | 68183          | 68142          | 68151          | 68160                   | 68169                      | 68178                  | 68187                  | 68196                                  | 68205          |  |
| 481                        | 68215          | 68224          | 68233          | 68242          | 68251                   | 6.4360                     | 68269                  | 68278                  | 68287                                  | 68296          |  |
| 482                        | 68305          | 68314          | 68323          | 68332          | 68341                   | 683 <i>5</i> 0             | 683 <i>5</i> 9         | 68368                  | 68377                                  | 68386          |  |
| 483                        | 68395          | 68404          | 68413          | 68422          | 68431                   | 68440                      | 68449                  | 684 <i>5</i> 8         | 68467                                  | 68476          |  |
| 484                        | 68485          | 68494          | 68502          | 68511          | 68520                   | 68529                      | 68538                  | 68547                  | 68556                                  | 68565          |  |
| 485                        | 68574          | 68583          | 68592          | 68601          | 68610                   | 68619                      | 68628                  | 68637                  | 68646                                  | 68655          |  |
| 486                        | 68664          | 68678          | 68681          | 68690<br>68780 | 68699                   | 68708                      | 68717                  | 68726                  | 68735                                  | 68744          |  |
| 467                        | 68758          | 68762<br>68851 | 68771<br>68860 | 68869          | 68789<br>68878          | 68797<br>68886             | 68806<br>68895         | 6881 <i>5</i><br>68904 | 68824<br>68913                         | 68833<br>68922 |  |
| 488<br>489                 | 68842<br>68931 | 68940          | 68949          | 68958          | 68966                   | 68975                      | 68984                  | 68993                  | 69002                                  | 69011          |  |
| 490                        | 69020          | 69028          | 69037          | 69046          | 69055                   | 69064                      | 69073                  | 69082                  | 69090                                  | 69099          |  |
| 491                        | 69108          | 69117          | 69126          | 69135          | 69144                   | 69152                      | 69161                  | 69170                  | 69179                                  | 69188          |  |
| 492                        | 69197          | 69205          | 69214          | 69223          | 69232                   | 69241                      | 69249                  | 69258                  | 69267                                  | 69276          |  |
| 493                        | 69285          | 69294          | 69302          | 69311          | 69320                   | 69329                      | 69338                  | 69346                  | 69 <b>3</b> 55                         | 69364          |  |
| 494                        | 69373          | 69381          | 69390          | 69399          | 69408                   | 69417                      | 69425                  | 69434                  | 69443                                  | 69452          |  |
| 495                        | 69461          | 69469          | 69478          | 69487          | 69496                   | 69504                      | 69513                  | 69522                  | 69531                                  | 69539          |  |
| 496                        | 69548          | 69557          | 69566          | 69574<br>69662 | 69583                   | 69592                      | 69601                  | 69609                  | 69618                                  | 69627          |  |
| 497                        | 69636          | 69644          | 69653          | 69749          | 69671<br>697 <i>5</i> 8 | 696 <b>79</b><br>69767     | 69688<br>6977 <i>5</i> | 69697<br>69784         | 69 <b>70<i>5</i></b><br>69 <b>7</b> 93 | 69714<br>69801 |  |
| 498<br>499                 | 69723<br>69810 | 69732<br>69819 | 69740<br>69827 | 69836          | 69845                   | 69854                      | 69862                  | 69871                  | 69880                                  | 69888          |  |
| 500                        | 69897          | 69906          | 69914          | 69928          | 69932                   | 69940                      | 69949                  | 69958                  | 69966                                  | 69975          |  |
| <i>5</i> 01                | 69984          | 69992          | 70001          | 70010          | 70018                   | 70027                      | 70036                  | 70044                  | 70053                                  | 70062          |  |
| <i>5</i> 02                | 70070          | 70079          | 70088          | 70096          | 70105                   | 70114                      | 70122                  | 70131                  | 70140                                  | 70148          |  |
| <i>5</i> 03                | 70157          | 70165          | 70174          | 70183          | 70191                   | 70200                      | 70209                  | 70217                  | 70226                                  | 70234          |  |
| 504                        | 70243          | 70252          | 70260          | 70269          | 70278                   | 70286                      | 70295                  | 70303                  | 70312                                  | 70321          |  |
| <i>5</i> 0 <i>5</i>        | 70329          | 70338          | 70346          | 70355          | 70364                   | 70372                      | 70381                  | 70389                  | 70398                                  | 70406          |  |
| 506<br>507                 | 70415          | 70424<br>70509 | 70432<br>70518 | 70441<br>70526 | 70449<br>70535          | 70458<br>705 <del>44</del> | 70467<br>70552         | 70475<br>70561         | 70484<br>70569                         | 70492<br>70578 |  |
| 507<br>508                 | 70501<br>70586 | 70595          | 70603          | 70612          | 70621                   | 70629                      | 70638                  | 70646                  | 70655                                  | .70663         |  |
| <i>5</i> 09                | 70672          | 70680          | 70689          | 70697          | 70706                   | 70714                      | 70723                  | 70731                  | 70740                                  | 70749          |  |
| 510                        | 70757          | 70766          | 70774          | 70783          | 70791                   | 70800                      | 70808                  | 70817                  | 70825                                  | 70854          |  |
| <i>5</i> 11                | 70842          | 70851          | 70859          | 70868          | 70876                   | 70885                      | 70893                  | 70902                  | 70910                                  | 70919          |  |
| 512                        | 70927          | 70935          | 70944          | 70952          | 70961                   | 70969                      | 70978                  | 70986                  | 70995                                  | 71008          |  |
| 513                        | 71012          | 71020          | 71029          | 71037          | 71046                   | 71054                      | 71063                  | 71071                  | 71079                                  | 71088          |  |
| 514                        | 71096          | 71105          | 71113          | 71122          | 71130                   | 71139                      | 71147                  | 71155                  | 71164                                  | 71178          |  |
| 515<br>516                 | 71181          | 71189          | 71198          | 71206          | 71214                   | 71223                      | 71231                  | 71240                  | 71248                                  | 71257<br>71341 |  |
| 516<br>517                 | 71265          | 71273          | 71282          | 71290          | 71299                   | 71307                      | 71315                  | 71324<br>71408         | 71332<br>71416                         | 71341          |  |
| <i>5</i> 17<br><i>5</i> 18 | 71349<br>71433 | 71357<br>71441 | 71366<br>71450 | 71874<br>71458 | 71383<br>71466          | 71391<br>71475             | 71399<br>71483         | 71492                  | 71500                                  | 71508          |  |
| 519                        | 71517          | 71525          | 71533          | 71542          | 71550                   | 71559                      | 71567                  | 71575                  | 71584                                  | 71592          |  |
|                            |                |                |                |                |                         |                            |                        |                        |  |                |  |

TABLE VIII.

### LOGARITHMS OF NUMBERS.

|                            | No. 520        | 05                     | 800.                           |                                    |                | <del></del>    | Log. 71                    | 600            | <del>76343.</del>      | ·.                               |
|----------------------------|----------------|------------------------|--------------------------------|------------------------------------|----------------|----------------|----------------------------|----------------|------------------------|----------------------------------|
| No.                        | 0              | 1                      | 2                              | 3                                  | 4              | 5              | 6                          | 7              | 8                      | 9                                |
| 520                        | 71600          | 71609                  | 71617                          | 71625                              | 71634          | 71642          | 71650                      | 71659          | 71667                  | 71675                            |
| 521<br>522                 | 71684          | 71775                  | 71700                          | 71709                              | 71717          | 71725          | 7179 <del>4</del><br>71817 | 71742          | 71750                  | 71759<br>71849                   |
| 523                        | 71850          | 71858                  | 71867                          | 71875                              | 71883          | 71892          | 71900                      | 71908          | 71917                  | 71925                            |
| 524                        | 71933          | 71941                  | 71950                          | 71958                              | 71966          | 71975          | 71983                      | 71991          | 71999                  | 72008                            |
| 525                        | 72016          | 72024                  | 72032                          | 79041                              | 72049          | 72057          | 72066                      | 72074          | 72082                  | 72090                            |
| 526                        | 72099          | 72107                  | 72115                          | 72123                              | 72132          | 72140          | 72148                      | 72156          | 72165                  | 72179                            |
| 527                        | 72181          | 72189                  | 72198                          | 72206                              | 72214          | 72222          | 72230                      | 72239          | 72247                  | 72255                            |
| 528<br>529                 | 72263<br>72346 | 72272<br>72354         | 72280<br>72362                 | 72288<br>72370                     | 72296<br>72378 | 72904<br>72987 | 72313<br>7239 <i>5</i>     | 72321<br>72403 | 72329<br>72411         | 72337<br>72419                   |
|                            | }              |                        |                                |                                    |                |                |                            | ļ              |                        |                                  |
| 530                        | 72428          | 72436                  | 72444                          | 72452                              | 72460          | 72469          | 72477                      | 72485          | 72493                  | 79501                            |
| 531<br>532                 | 72509<br>72591 | 72518<br>72599         | 72526                          | 72534<br>72616                     | 72542<br>72624 | 72550<br>72632 | 72558<br>72640             | 72567<br>72648 | 72575<br>72656         | 72583                            |
| 532<br>533                 | 72678          | 72681                  | 72689                          | 72697                              | 72705          | 72713          | 72722                      | 72790          | 72738                  | 7 <b>26</b> 65<br>7 <b>274</b> 6 |
| 594                        | 72754          | 72762                  | 72770                          | 72779                              | 72787          | 72795          | 72803                      | 72811          | 72819                  | 72827                            |
| 585                        | 72835          | 72848                  | 72852                          | 72860                              | 72868          | 72876          | 72884                      | 72892          | 72900                  | 72908                            |
| 536                        | 72916          | 72925                  | 72933                          | 72941                              | 72949          | 72957          | 72965                      | 72973          | 72981                  | 72989                            |
| <i>5</i> 37                | 72997          | 73006                  | 73014                          | 73022                              | 73030          | 78058          | 73046                      | 78054          | 73062                  | 78070                            |
| <i>5</i> 38<br><i>5</i> 39 | 73078<br>73159 | 73086<br>73167         | 73094<br>79175                 | 73102<br>7318 <b>3</b>             | 73111<br>73191 | 78119<br>73199 | 73127<br>73207             | 78185<br>78215 | 73143<br>73223         | 73151<br>73231                   |
| ~                          |                | <u> </u>               | ļ                              |                                    |                |                |                            |                | <u>_</u>               |                                  |
| 540                        | 73239<br>73320 | 79247<br>79329         | 73255<br>73336                 | 73 <b>263</b><br>733 <del>44</del> | 73272<br>73352 | 73280<br>73360 | 73288<br>73368             | 73296<br>73376 | 73304<br>73384         | 73312                            |
| 541<br>542                 | 73400          | 73408                  | 73416                          | 79424                              | 79432          | 78440          | 73448                      | 73456          | 73464                  | 73392<br>73472                   |
| 543                        | 73480          | 73488                  | 73496                          | 73504                              | 73512          | 73520          | 73528                      | 73536          | 78544                  | 78552                            |
| 544                        | 73560          | 73568                  | 73576                          | 73584                              | 73592          | 73600          | 73608                      | 73616          | 73624                  | 78632                            |
| 545                        | 73640          | 73648                  | 73656                          | 73664                              | 73672          | 73679          | 73687                      | 73695          | 73703                  | 78711                            |
| 546                        | 73719          | 78727                  | 78785                          | 79749                              | 73751          | 73759          | 73767                      | 73775          | 73783                  | 73791                            |
| 547<br>548                 | 73799<br>73878 | 73807<br>73886         | 7381 <i>5</i><br>73894         | 738 <b>23</b><br>73902             | 73830<br>73910 | 73838<br>73918 | 78846<br>73926             | 73854<br>73933 | 73862<br>73941         | 73870                            |
| <b>54</b> 9                | 73957          | 73965                  | 73973                          | 73981                              | 73989          | 73997          | 74005                      | 74013          | 74020                  | 73949<br>74028                   |
| 550                        | 74036          | 74944                  | 74052                          | 74060                              | 74068          | 74076          | 74084                      | 74092          | 74099                  | 74107                            |
| 551                        | 74115          | 74123                  | 74131                          | 74139                              | 74147          | 74155          | 74162                      | 74170          | 74178                  | 74186                            |
| 552<br><b>3</b> 53         | 74194<br>74273 | 74202<br>74280         | 74210<br>74288                 | 74218<br>74296                     | 74225<br>74304 | 74233<br>74312 | 74241<br>74320             | 74249<br>74327 | 74257<br>74335         | 74265<br>74343                   |
| 554                        | 74351          | 74359                  | 74367                          | 74374                              | 74382          | 74390          | 74398                      | 74406          | 74414                  | 74421                            |
| 555                        | 74429          | 74437                  | 74445                          | 74453                              | 74461          | 74468          | 74476                      | 74484          | 74492                  | 74500                            |
| 55 <u>6</u>                | 74507          | 74515                  | 74523                          | 71531                              | 74539          | 74547          | 74554                      | 74562          | 74570                  | 7 <b>457</b> 8                   |
| 557                        | 74586          | 74593                  | 74601                          | 74609                              | 74617          | 74624          | 74632                      | 74640          | 74648                  | 74656                            |
| 558<br>559                 | 74663<br>74741 | 74671<br>74749         | <b>746</b> 79<br><b>74</b> 757 | 74687<br>74764                     | 74695<br>74772 | 74702<br>74780 | 74710<br>74788             | 74718<br>74796 | 74726<br>74803         | 74783<br>74811                   |
| 560                        | 74819          | 74827                  | 74834                          | 74842                              | 74850          | 74858          | 74865                      | 74873          | 74881                  | 74889                            |
| <i>5</i> 61                | 74896          | 74904                  | 74912                          | 74920                              | 74927          | 74935          | 74943                      | 74950          | 74958                  | 74966                            |
| 562                        | 74974          | 74981                  | 74989                          | 74997                              | 75005          | 75012          | 75020                      | 75028          | 75035                  | 75043                            |
| 563                        | 75051          | 75059                  | 75066                          | 75074                              | 75082          | 75089          | 75097                      | 75105          | 75113                  | 75120                            |
| 564                        | 75128          | 75136                  | 75143                          | 75151                              | 75159          | 75166          | 75174                      | 75182          | 75189                  | 75197                            |
| 565<br>566                 | 75205<br>75282 | 75213                  | 75220                          | 75228                              | 75236          | 75243          | 75251                      | 75259          | 75266                  | 75274                            |
| <i>5</i> 67                | 75358          | 75289<br>75366         | 75297<br>75374                 | 75395<br>75381                     | 75312<br>75389 | 75320<br>75397 | 75328<br>75404             | 75335<br>75412 | 75343<br>75420         | 75351<br>75427                   |
| 568                        | 75483          | 75442                  | 75450                          | 75458                              | 75465          | 7547 <b>3</b>  | 75481                      | 75488          | 75496                  | 75504                            |
| 569                        | 75511          | 75519                  | 75526                          | 75534                              | 75542          | 75549          | 75557                      | 75565          | 75572                  | 75580                            |
| · 570                      | 75587          | 7559 <b>5</b>          | 75603                          | 75610                              | 75618          | 75626          | 75633                      | 75641          | 75648                  | 75656                            |
| <i>5</i> 71                | 75664          | 75671                  | 75679                          | 75686                              | 75694          | 75702          | 75709                      | 75717          | 75724                  | 75732                            |
| 572<br>573                 | 75740<br>75815 | 75747                  | 75755                          | 75762                              | 75770          | 75778<br>75853 | 75785                      | 75793          | 75800                  | 75808                            |
| 574                        | 75891          | 758 <b>23</b><br>75899 | 75831<br>75906                 | 75838<br>75914                     | 75846<br>75921 | 75929          | 75861<br>75987             | 75868<br>75944 | 75876<br>75952         | 75884<br>75959                   |
| 575                        | 75967          | 75974                  | 75982                          | 75989                              | 75997          | 76005          | 76012                      | 76020          | 76027                  | 76035                            |
| 576                        | 76042          | 76050                  | 76057                          | 76065                              | 76072          | 76080          | 76087                      | 76095          | 76109                  | 76110                            |
| 577                        | 76118          | 76125                  | 76133                          | 76140                              | 76148          | 76155          | 7.6163                     | 76170          | 76178                  | 76185                            |
| 578<br>519                 | 76193<br>76268 | 76200<br>7627 <i>5</i> | 7620 <b>\$</b><br>7628\$       | 76215<br>76290                     | 76223<br>76298 | 76230<br>76305 | 76298<br>76313             | 76245<br>76320 | 762 <b>53</b><br>76328 | 76260<br>7633 <i>5</i>           |
|                            | 0              | <u> </u>               |                                | 9                                  | 4              | 5              | 6                          | 7              | 8                      | 9                                |
|                            |                |                        |                                |                                    |                |                |                            |                |                        |                                  |

TABLE VIII.
LOGAR!THMS OF NUMBERS.

|                            | No. 5800       | 64             | 100            |                |                |                | Log. 76                | 5343           | 80618          |                |
|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------------|----------------|----------------|----------------|
| No.                        | 0              | 1              | 2              | 3              | 4              | 5              | ` 6                    | 7.             | 8              | 9              |
| 580                        | 76343          | 76350          | 76358          | 76365          | 76373          | 76380          | 76388                  | 76395          | 76403          | 76410          |
| 581                        | 76418          | 76425          | 76433          | 76440          | 76448          | 76455          | 76462                  | 76470          | 76477          | 76485          |
| 582                        | 76192          | 76500          | 76507          | 76515          | 76522          | 76530          | 76537                  | 76545          | 76552          | 765 <b>59</b>  |
| 583                        | 76567          | 76574          | 76582          | 76589          | 76597          | 76604          | 76612                  | 76619          | 76626          | 76634          |
| 584                        | 76641          | 76649          | 76656          | 76664          | 76671          | 76678          | 76686                  | 76693          | 76701          | 76708          |
| <i>5</i> 85                | 76716          | 76723          | 76730          | 76738          | 76745          | 76753          | 7676Q                  | 76768          | 76775          | 76782          |
| 586                        | 76790          | 76797          | 76805          | 76812          | 76819          | 76827          | 76854                  | 76842          | 76849          | 76856          |
| 587                        | 76864          | 76871          | 76879          | 76886          | 76893          | 76901          | 76908                  | 76916          | 76923          | 76990          |
| 588                        | 76938<br>77012 | 76945          | 76958          | 76960<br>77034 | 76967          | 76975          | 70982                  | 76989<br>77063 | 76997          | 77004          |
| 589                        |                | 77019          | 77026          |                | 77041          | 77048          | 77056                  |                | 77070          | 77078          |
| 590                        | 77085          | 77098          | 77100          | 77107          | 77115          | 77122          | 77129                  | 77137          | 77144          | 77151          |
| 591                        | 77159          | 77166          | 77173          | 77181          | 77183          | 77195          | 77203                  | 77210          | 77217          | 77225          |
| 592                        | 77232          | 77240          | 77247          | 77254          | 77262          | 77269          | 77276                  | 77283          | 77291          | 77298          |
| 595                        | 77879          | 77313          | 77320          | 77827          | 77335          | 77342          | 77349<br>77422         | 77857          | 77364          | 77371          |
| 594                        | 77452          | 77386          | 77393<br>77466 | 77401          | 77408          | 77415          |                        | 77430          | 77437          | 77444          |
| <b>595</b>                 | 77525          | 77459<br>77532 | 77539          | 77474<br>77546 | 77481<br>77554 | 77.188         | 77495<br>77568         | 77503<br>77576 | 77510<br>77583 | 77517<br>77590 |
| <i>5</i> 96<br><b>5</b> 97 | 77597          | 77605          | 77612          | 77619          | 77627          | 77561<br>77634 | 77641                  | 77648          | 77656          | 77663          |
| 598                        | 77670          | 77677          | 77685          | 77692          | 77699          | 77706          | 77714                  | 77721          | 77728          | 77735          |
| 59 <b>9</b>                | 77748          | 77750          | 77757          | 77764          | 77772          | 77779          | 77786                  | 77793          | 77801          | 77808          |
|                            |                |                |                |                |                |                |                        |                |                | l              |
| 600                        | 77815          | 77822          | 77830          | 77837          | 77844          | 77851          | 77859                  | 77866          | 7.7873         | 77880          |
| 601                        | 77887          | 77895          | 77902          | 77909          | 77916          | 77924          | 77931                  | 77938<br>78010 | 77945<br>78017 | 77952          |
| 602                        | 78032          | 77967<br>78039 | 77974<br>78046 | 77981<br>78058 | 77988<br>78061 | 77996<br>78068 | 78003<br>7807 <i>5</i> | 78010          | 78017          | 78025<br>78097 |
| 603<br>604                 | 78104          | 78111          | 78118          | 7812 <b>5</b>  | 78132          | 78140          | 78147                  | 78154          | 78161          | 78168          |
| 605                        | 78176          | 78183          | 78190          | 78197          | 78204          | 78211          | 78219                  | 78226          | 78233          | 78240          |
| 606                        | 78247          | 78254          | 78262          | 78269          | 78276          | 78283          | 78290                  | 78297          | 78305          | 78312          |
| 607                        | 78819          | 78326          | 78333          | 78340          | 78347          | 78355          | 78362                  | 78369          | 78376          | 78383          |
| 608                        | 78390          | 78398          | 78405          | 78412          | 78419          | 78426          | 78433                  | 78440          | 78447          | 78455          |
| 609                        | 78462          | 78469          | 78476          | 78483          | 78490          | 78497          | 78504                  | 78512          | 78519          | 78526          |
| 610                        | 78533          | 78540          | 78547          | 78554          | 78561          | 78569          | 78576                  | 78583          | 78590          | 78597          |
| 611                        | 78604          | 78611          | 78618          | 78625          | 78633          | 78640          | 78647                  | 78654          | 78661          | 78668          |
| 612                        | 78675          | 78682          | 78689          | 78696          | 78704          | 78711          | 78718                  | 78725          | 78732          | 78799          |
| 613                        | 78746          | 78753          | 78760          | 78767          | 78774          | 78781          | 78789                  | 78796          | 78803          | 78810          |
| 614                        | 78817          | 78824          | 78831          | 78898          | 78845          | 78852          | 78859                  | 78866          | 78873          | 78880          |
| 615                        | 78888          | 78895          | 78902          | 78909          | 78916          | 78923          | 78930                  | 7893 <b>7</b>  | 78944          | 78951          |
| 616                        | 78958          | 78965          | 78972          | 78979          | 78986          | 78993          | 79000                  | 79007          | 79014          | 79021          |
| 617                        | 79029          | 79036          | 79043          | 79050          | 79057          | 79064          | 79071                  | 79078          | 79085          | 79092          |
| 618                        | 79099          | 79106          | 79113          | 79120          | 79127          | 79134          | 79141                  | 79148          | 79155          | 79162          |
| 619                        | 79169          | 79176          | 79183          | 79190          | 79197          | 79204          | 79211                  | 79218          | 79225          | 79232          |
| 620                        | 79239          | 79246          | 79253          | 79260          | 79267          | 79274          | 79281                  | 79288          | 79295          | 79302          |
| 621                        | 79309          | 79316          | 79323          | 79330          | 79337          | 79344          | 79351                  | 79358          | 79365          | 79372          |
| 622                        | 79379          | 79386          | 79393          | 79400          | 79407          | 79414          | 79421                  | 79428          | 79435          | 79442          |
| 623                        | 79449          | 79456          | 79463          | 79470          | 79477          | 79484          | 79491                  | 79498          | 79505          | 79511          |
| 624                        | 79518          | 79525          | 79552          | 79539          | 79546          | 79553          | 79560                  | 79567          | 79574          | 79581          |
| 625                        | 79588          | 79595          | 79602          | 79609          | 79616          | 79623          | 79630                  | 79637          | 79644          | 79650          |
| 626                        | 79657          | 79664          | 79671          | 79678          | 79685          | 79692          | 79699                  | 79706          | 79713          | 79720          |
| 627<br>628                 | 79727          | 79734          | 79741          | 79748          | 79754          | 79761          | 79768                  | 79775          | 79782          | 79789          |
| 628<br>629                 | 79865          | 79803<br>79872 | 79810          | 79817<br>79886 | 79824<br>79893 | 79831          | 79837                  | 79844<br>79913 | 79851<br>79920 | 79858<br>79927 |
| 630                        | 79934          | 79941          | 79948          | 79955          |                |                | 79975                  | 79982          | 79989          | 79996          |
| 631                        | 80003          | 80010          | 80017          | 80024          | 79962<br>80030 | 79969<br>80037 | 80044                  | 80051          | 80058          | 80065          |
| 632                        | 80072          | 80079          | 80085          | 80092          | 80099          | 80106          | 80118                  | 80120          | 80127          | 80134          |
| 633                        | 80140          | 80147          | 80154          | 80161          | 80168          | 80175          | 80182                  | 80188          | 80195          | 80202          |
| 634                        | 80209          | 80216          | 80228          | 80229          | 80236          | 80243          | 80250                  | 80257          | 80264          | 80271          |
| 633                        | 80277          | 80284          | 80291          | 80298          | 80305          | 80312          | 80238                  | 80325          | 80332          | 80339          |
| 636                        | 80846          | 80353          | 80359          | 80866          | 80373          | 80380          | 80387                  | 80393          | 80400          | 80407          |
| 637                        | 80414          | 80421          | 80428          | 80494          | 80441          | 80448          | 80455                  | 80462          | 80468          | 80475          |
| 638                        | 67482          | 80489          | 80496          | 80502          | 80509          | 80516          | 80528                  | 80590          | 80586          | 80543          |
| 639                        | 80550          | 80557          | 80564          | 80570          | 80577          | 80584          | 80591                  | 80598          | 80604          | 80613          |
|                            | 0              | 1              | 1 2            | 3              | 4              | 5              | 6                      | 7              | 8              | 9              |

# TABLE VIII.

| No. 6400—7000 Log. 80618—84510 |                |                |                |                |                | )              |                |                        |                |                            |
|--------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------------|----------------|----------------------------|
| No.                            | 0              | 1              | 2              | 8              | 4              | 5              | 6              | 7                      | 8              | 9                          |
| 640                            | 80618          | 80625          | 80632          | 80638          | 80645          | 80652          | 80659          | 80665                  | 80672          | 80679                      |
| 641                            | 80686          | 80698          | 80699          | 807061         |                | 80720          | 80726          | 80733                  | 80740          | 80747                      |
| 642                            | 80754          | 80760          | 80767          | 80774          | 80781          | 30787          | 80794          | 80801                  | 80808          | 80814                      |
| 643                            | 80821          | 80828          | 80835          | 80841          | 80848          | 80855          | 80862          | 80868                  | 80875          | 80882                      |
| 644                            | 80889          | 80895          | 80902          | 80909          | 80916          | 80922          | 80929          | 80936                  | 80943          | 80949                      |
| 645                            | 80956          | 80963          | 80969          | 80976          | 80983          | 80990          | 80996          | 81003                  | 81010          | 81017                      |
| 646                            | 81023          | 81030          | 81037          | 81043          | 81050          | 81057          | 81064          | 81070                  | 81077          | 81084                      |
| 647                            | 81090          | 81097          | 81104          | 81111          | 81117          | 81124          | 81131          | 81137                  | 81144          | 81151                      |
| 648                            | 81158          | 81164          | 81171          | 81178          | 81184          | 81191          | 81198          | 81204                  | 81211          | 81218                      |
| 649                            | 81224          | 81231          | 81238          | 81245          | 81251          | 81258          | 81265          | 81271                  | 81278          | 81285                      |
| 650                            | 81291          | 81298          | 81305          | 81311          | 81318          | 81325          | 81331          | 81338                  | 81345          | 81351                      |
| 651                            | 81358          | 81365          | 81374          | 81378          | 81385          | 81391          | 81398          | 81405                  | 81411          | 81418 •                    |
| 652                            | 81425          | 81431          | 81438          | 81445          | 81451          | 81458          | 81465          | 81471                  | 81478          | 81485.                     |
| 653 ,                          | 81491          | 81498          | 81505          | 81511          | 81518          | 81525          | 81531          | 81538                  | 81544          | 81551                      |
| 654                            | 81558          | 81,564         | 81571          | 81578          | 81584          | 81591          | 81598          | 81604                  | 81611          | 81617                      |
| 655                            | 81624          | 81631          | 81637          | 81644          | 81651          | 81657          | 81664          | 81671                  | 81677          | 81684                      |
| 656                            | 81690          | 81697          | 81704          | 81710          | 81717          | 81723          | 81730          | 81797                  | 81743          | 81750                      |
| - 657                          | 81757          | 81763          | 81770          | 81776          | 81783          | 81790          | 81796          | 81803                  | 81809          | 81816                      |
| 658                            | 81823          | 81829          | 81836          | 81842          | 81849          | 81856          | 81862          | 81869                  | 81875          | 81882                      |
| 6.59                           | 81889          | 81895          | 81902          | 81908          | 81915          | 81921          | 81928          | 81935                  | 81941          | 81948                      |
| 660                            | 81954          | 81961          | 81968          | 81974          | 81981          | 81987          | 81994          | 82000                  | 82007          | 82014                      |
| 661                            | 82020          | 82027          | 82033          | 82040*         | 82046          | 82053          | 82060          | 82066                  | 82073          | 82079                      |
| 662                            | 82086          | 82092          | 82099          | 82105          | 82112          | 82119          | 82125          | 82132                  | 8.138          | 82145                      |
| 663                            | 82151          | 82158          | 82164          | 82171          | 82178          | 82184          | 82191          | 82197                  | 82204          | 82210                      |
| 664                            | 82217          | 82223          | 82230          | ,82236         | 82243          | 82249          | 82256          | 82263                  | 82269          | 82276                      |
| 665                            | 82282          | 82289          | 82295          | 82302          | 82308          | 82315          | 82321          | 82328                  | 82334          | 82341                      |
| 666                            | 82947          | 82354          | 82360          | 82367          | 82573          | 82380          | 82387          | 82393                  | 82400          | 82406                      |
| 667                            | 82413          | 82419          | 82426          | 82432          | 82439          | 82445          | 82452          | 82458                  | 82465          | 82471                      |
| 668                            | 82478<br>82543 | 82484          | 82491          | 82497          | 82504          | 82510          | 82517          | 82523                  | 82530          | 82536                      |
| 669                            |                | 82549          | 82556          | 82562          | 82569          | 82575          | 82582          | 82588                  | 82595          | 82601                      |
| 670                            | 82607          | 82614          | 82620          | 82627          | 82633          | 82640          | 82646          | 82653                  | 82659          | 826.13                     |
| 671                            | 82672          | 82679          | 82685          | 82692          | 82698          | 82705          | 82711          | 82718                  | 82724          | 82730                      |
| 672                            | 82737          | 82743          | 82750          | 82756          | 82763          | 82769          | 82776          | 82782                  | 82789          | 82795                      |
| 673                            | 82802          | 82808          | 82814          | 82821          | 82827          | 82834          | 82840          | 82847                  | 82858          | 82860                      |
| 674                            | 82866          | 82872          | 82879          | 82885          | 82892          | 82898          | 82905          | 82911                  | 82918          | 82924                      |
| 67 <i>5</i><br>676             | 82930<br>82995 | 82937          | 82943          | 82950          | 82956<br>83020 | 82963          | 82969          | 8297 <i>5</i><br>83040 | 82982<br>83046 | 8298 <del>8</del><br>83052 |
| 677                            | 83059          | 83001<br>83065 | 83008<br>83072 | 83014<br>83078 | 83085          | 83027<br>83091 | 83033<br>83097 | 83104                  | 83110          | 83117                      |
| 678                            | 83123          | 83129          | 83136          | 83142          | 83149          | 83155          | 83161          | 83168                  | 83174          | 83181                      |
| 679                            | 83187          | 83193          | 83200          | 83206          | 83213          | 83219          | 83225          | 83232                  | 83238          | 89245                      |
|                                |                |                |                | !              |                |                |                |                        |                |                            |
| 680                            | 83251          | 83257          | 83264          | 83270          | 83276          | 83283          | 83289          | 83296                  | 83302          | 83308                      |
| 681                            | 83315          | 83321          | 80327          | 89334          | 83340          | 83347          | 83353          | 89359                  | 83366          | 83372                      |
| 682                            | 83378<br>83442 | 83385          | 83391          | 83398          | 83404          | 83410          | 83417          | 83423                  | 83429          | 89436<br>83499             |
| 683<br>684                     | 83506          | 83448<br>83512 | 83455          | 83461          | 83467<br>83531 | 83474          | 83480          | 83487<br>89550         | 83493<br>83556 | 83 <i>5</i> 63             |
| 685                            | 83569          | 83575          | 83518<br>83582 | 83525<br>83588 | 83594          | 83537<br>83601 | 83544<br>89607 | 83613                  | 83620          | 83626                      |
| 686                            | 83632          | 83639          | 83645          | 83651          | 83658          | 83664          | 83670          | 83677                  | 83683          | 83689                      |
| 687                            | 83696          | 83702          | 83708          | 83715          | 83721          | 83727          | 83734          | 83740                  | 83746          | 83753                      |
| 688                            | 83759          | 83765          | 83771          | 83778          | 83784          | 85790          | 83797          | 83803                  | 83809          | 83816                      |
| 689                            | 83822          | 83828          | 83835          | 83841          | 83847          | 83853          | 88860          | 83866                  | 83872          | 83879                      |
| 690                            | 83885          | 83891          |                |                |                | '              | '              | 83000                  | 83935          | 83942                      |
| 691                            | 83948          | 83954          | 83897<br>83960 | 83904<br>83967 | 83910<br>83973 | 83916<br>83979 | 83923<br>83985 | 83929<br>83992         | 83933          | 84001                      |
| 692                            | 84011          | 84017          | 84023          | 84029          | 84036          | 84042          | 84048          | 84055                  | 84061          | 84067                      |
| 693                            | 84073          | 84080          | 84086          | 84092          | 84098          | 84105          | 84111          | 84117                  | 84123          | 84130                      |
| 694                            | 84136          | 84142          | 84148          | 84155          | 84161          | 84167          | 84173          | 84180                  | 84186          | 84192                      |
| 695                            | 84198          | 84205          | 84211          | 84217          | 84223          | 84230          | 84236          | 84242                  | 84248          | 84255                      |
| ' 696                          | 84261          | 84267          | 84273          | 84280          | 84286          | 84292          | 84298          | 84305                  | 84911          | 84317                      |
| 697                            | 84323          | 84930          | 84336          | 84942          | 84348          | 84354          | 84961          | 84367                  | 84973          | 84379                      |
| 698                            | 84386          | 84392          | 84398          | 84404          | 84410          | 84417          | 84423          | 84429                  | 84495          | 84442                      |
| 699                            | 84448          | 84454          | 84460          | 84466          | 84479          | 84479          | 84485          | 84491                  | 84497          | 84504                      |
|                                |                | <del></del>    |                |                | <del></del>    | <del></del> -  |                | <del></del>            |                |                            |

# TABLE VIII.

|                     | No. 7000       | 7                      | 600                     | Log. 84510 88081 |                        |                         |                                |                |                |                            |
|---------------------|----------------|------------------------|-------------------------|------------------|------------------------|-------------------------|--------------------------------|----------------|----------------|----------------------------|
| No.                 | 0              | 1                      | \ <b>2</b>              | 3                | 4 .                    | 5                       | 6                              | 7              | 8              | 9                          |
| 700                 | 84510          | 84516                  | 84522                   | 84528            | 84535                  | 84541                   | 84547                          | 84553          | 84559          | 84566                      |
| 701                 | 84572          | 84578                  | 84584                   | 84590            | 84597                  | 84603                   | 84609                          | 84615          | 84621          | 84698                      |
| 702<br>703          | 8±634<br>84696 | 84640<br>84702         | 84646 -<br>84708        | 84652<br>84714   | 84658                  | 84665                   | 84671                          | 84677          | 84683          | 84689                      |
| 704                 | 84757          | 84763                  | 84770                   | 84776            | 84720<br>84782         | 84726<br>84788          | 8473 <b>3</b><br>8479 <b>4</b> | 84739<br>84800 | 84745<br>84807 | 84751<br>8481 <b>3</b>     |
| 705                 | 84819          | 84825                  | 84831                   | 84837            | 84844                  | 84950                   | 84856                          | 84862          | 84868          | 84874                      |
| 706                 | 84880          | 84887                  | 84898                   | 84899            | 84905                  | 84911                   | 84917                          | 84924          | 84990          | 84936                      |
| 707                 | 84942          | 84948                  | 84954                   | 84960            | 84967                  | 84973                   | 84979                          | 84985          | 84991          | 84997                      |
| 708                 | 85003          | 85009                  | 85016.                  | 85022            | 85028                  | 85034                   | 85040                          | 85046          | 85052          | 85058                      |
| 709                 | 85065          | 85071                  | 85077                   | 85085            | 85089                  | 85095                   | 85101                          | 85107          | 85114          | 85120                      |
| 710                 | 85126          | 85132                  | 85138                   | 85144            | 851 <i>5</i> 0         | 85156                   | 85163                          | 85169          | 85175          | 85181                      |
| 711<br>712          | 85187<br>85248 | 85199<br>85254         | 85199<br>85260          | 85205<br>85266   | 85211<br>85272         | 85217<br>85278          | 85224<br>85285                 | 85230          | 85236          | 85242<br>85305             |
| 743                 | 85309          | 8 <i>5</i> 31 <i>5</i> | 85321                   | 85327            | 85353                  | 85339                   | 85345                          | 85291<br>85352 | 85297<br>85358 | 85364                      |
| 714                 | 85370          | 85376                  | 85382                   | 85388            | 85394                  | 85400                   | 85406                          | 85412          | 85418          | 85425                      |
| 715                 | 85431          | 85437                  | 85443                   | 85449            | 85455                  | 85461                   | 85467                          | 85473          | 85479          | 85485                      |
| 716                 | 85491          | 85497                  | 85503                   | 85509            | 85516                  | 85522                   | 85528                          | 85534          | 85540          | 85546                      |
| · 717<br>718        | 85552          | 85558                  | 85564                   | 85570            | 85576                  | 85582                   | 85588                          | 85594          | 85600          | 85606                      |
| 718                 | 85612<br>85675 | 85618<br>85679         | 85625<br>85685          | 85631<br>85691   | 85637<br>85697         | 85649<br>85703          | 85649                          | 85655<br>85715 | 85661<br>85721 | 85667                      |
| -                   |                |                        |                         |                  |                        | <b></b>                 | 85709                          |                | <u> </u>       | 85727                      |
| 720<br>721          | 85733<br>85794 | 85739<br>85800         | 85745<br>8 <b>580</b> 6 | 85751<br>85812   | 85757                  | 85768                   | 85769                          | 85775<br>85836 | 85781          | 85788                      |
| 722                 | 85854          | 85860                  | 85866                   | 85872            | 85818<br>85878         | 85824<br>85884          | 85830<br>85890                 | 85896          | 85842<br>85902 | 85848<br>85908             |
| 723                 | 85914          | 85920                  | 85926                   | 85932            | 85938                  | 85944                   | 85950                          | 85956          | 85962          | 85968                      |
| 724                 | 85974          | 85980                  | 85986                   | 85992            | 85998                  | 86004                   | 86010                          | 86016          | 86022          | 86028                      |
| 725                 | 86034          | 86040                  | 86046                   | 86052            | 86058                  | 86064                   | 86070                          | 86076          | 86082          | 86088                      |
| 786                 | 86094          | 86100                  | 86106                   | 86112            | 86118                  | 86124                   | 86130                          | 86136          | 86141          | 86147                      |
| 727<br>728          | 86153<br>86213 | 86159                  | 86165                   | 86171            | 86177                  | 86183                   | 86189                          | 86195          | 86201          | 86207                      |
| 729                 | 86273          | 86219<br>86279         | 86225<br>86285          | 86231<br>86291   | 86237<br>86297         | 86243<br>8630 <b>3</b>  | 86249<br>86308                 | 86255<br>86314 | 86261<br>86320 | 86267<br>86326             |
| 730                 | 86332          | 86938                  | 86844                   | 863 <i>5</i> 0   | 86356                  | 86362                   | 86368                          | 66374          | 86380          | 86986                      |
| 731                 | 86592          | 86598                  | 86404                   | 86410            | 86415                  | 86421                   | 86427                          | 86433          | 86439          | 86445                      |
| 732                 | 86451          | 86457                  | 86463                   | 86469            | 86475                  | 86481                   | 86487                          | 86493          | 86499          | 86504                      |
| 733                 | 86510          | 86516                  | 86522                   | 86528            | 86534                  | 86540                   | 86546                          | 86552          | 86558          | 86564                      |
| 794<br>795          | 86570<br>86629 | 86576<br>86635         | 86581<br>86641          | 86587<br>86646   | 86593                  | 86599                   | 86605                          | 86611          | 86617          | 86623                      |
| 736                 | 86688          | 86694                  | 86700                   | 86705            | 86652<br>86711         | 86658 <sup>2</sup>      | 86664<br>86723                 | 86670<br>86729 | 86676<br>86735 | 8668 <del>2</del><br>86741 |
| 737                 | 86747          | 86753                  | 86759                   | 86764            | -86770                 | 86776                   | 86782                          | 86788          | 86794          | 86800                      |
| 738                 | 86806          | 86812                  | 86817                   | 86823            | 86829                  | 86835                   | 86841                          | 86847          | 86853          | 86859                      |
| 739                 | 86864          | 86870                  | 86876                   | 86882            | 86888                  | 86894                   | 86900                          | 86906          | 86911          | 86917                      |
| 740                 | 86923          | 86929                  | 86935                   | 86941            | 86947                  | 86953                   | 86958                          | 86964          | 86970          | 86976                      |
| 741<br>742          | 86982<br>87040 | 86988<br>87046         | 86994<br>87052          | 86999            | 87005                  | 87011                   | 87017                          | 87023          | 87029          | 87C35                      |
| 743                 | 87099          | 87105                  | 87111                   | 87058<br>87116   | 87064<br>87122         | 87070<br>871 <b>2</b> 8 | 87075`<br>87134                | 87081<br>87140 | 87087<br>87146 | 87093<br>871 <i>5</i> 1    |
| 744                 | 87157          | 87163                  | 87169                   | 87175            | 87181                  | 87186                   | 87192                          | 87198          | 87204          | 87210                      |
| 745                 | 87216          | 87221                  | 87227                   | 87233            | 87239                  | 87245                   | 87251                          | 87256          | 87262          | 87268                      |
| 746                 | 87274          | 87280                  | 87286-                  | 87291            | 87297                  | 87303                   | 87309                          | 87315          | 87320          | 87326                      |
| 747                 | 87332          | 87938                  | 87944                   | 87349            | 873 <i>55</i>          | 87361                   | 87367                          | 87973          | 87379          | 87384                      |
| 748<br>7 <b>4</b> 9 | 87390<br>87448 | 87396<br>87454         | 87402<br>87460          | 87408 1<br>87466 | 87413<br>87471         | 87419<br>87477          | 87425<br>87483                 | 87431<br>87489 | 87437<br>87495 | 87442<br>87 <i>5</i> 00    |
| 750                 | 87506          | 87812                  | 87518                   | 87523            | 87529                  | 87535                   | 87541                          | 87547          |                |                            |
| 751                 | 87564          | 87570                  | 87576                   | 87581            | 87587 ·                | 87593                   | 87 <i>5</i> 99                 | 87604          | 87552<br>87610 | 87558<br>8761 <b>6</b>     |
| 752                 | 87622          | 87628                  | 87633                   | 87639            | 87645                  | 87651                   | 87656                          | 87662          | 87668          | 87674                      |
| 753                 | 87679          | 87685                  | 87691                   | <b>.87697</b>    | 87703                  | 87708                   | 87714                          | 87720          | 87726          | 87731                      |
| 754                 | 87737          | 87748                  | 87749                   | 87754            | 87760                  | 87766                   | 87772                          | 87777          | 87783          | 87789                      |
| 7.55<br>7.56        | 87795<br>87852 | 87800<br>8785 <b>8</b> | 87806<br>87864          | 87812<br>87869   | 87818                  | 87823                   | 87829<br>87887                 | 87835          | 87841          | 87846                      |
| 757                 | 87910          | 87915                  | 87921                   | 87927            | 8787 <i>5</i><br>87933 | 87881<br>87938          | 87944                          | 87892<br>87950 | 87898<br>87955 | 87904<br>87961             |
| 758                 | 87967          | 87973                  | 87978                   | 87984            | 87990                  | 67996                   | 88001                          | 88007          | 88013          | 88018                      |
| 759                 | 88024          | 88060                  | 88036                   | 88041            | 88047                  | 88053                   | 88058                          | 88064          | 88070          | 88076                      |
|                     | 0              | 1                      | 8                       | 3                | 4                      | 5                       | 6                              | 7              | 8              | 9                          |

TABLE VIII.

|              | No. 7600       | 88             | 200                     |                         |                        |                        | Log. 8         | 8081           | <b>—91381</b>           |                         |
|--------------|----------------|----------------|-------------------------|-------------------------|------------------------|------------------------|----------------|----------------|-------------------------|-------------------------|
| No.          | 0              | 1 1            | 1 2                     | 8                       | 4                      | 5                      | 6              | 7.             | 8                       | 1 9                     |
| l            |                |                |                         |                         |                        |                        |                | <b></b>        |                         |                         |
| 760<br>761   | 88081<br>88138 | 88087<br>88144 | 88098<br>881 <i>5</i> 0 | 88098<br>881 <i>5</i> 6 | 88104                  | 88110                  | 88116          | 88121<br>88178 | 88127                   | 88133<br>88190          |
| 762          | 88195          | 88201          | 88207                   | 88213                   | 88161<br>88218         | 88167<br>88224         | 88179<br>88230 | 88235          | 88184<br>88241          | 88247                   |
| 763          | 88252          | 88258          | 88264                   | 88270                   | 88275                  | 88281                  | 88287          | 88292          | 88298                   | 88304                   |
| 764          | 88309          | 88315          | 88321                   | 88326                   | 88332                  | 88338                  | 88343          | 88349          | 88355                   | 88360                   |
| 765          | 88366          | 88372          | 88377                   | 88383                   | 88389                  | 88395                  | 88400          | 88406          | 88412                   | 88417                   |
| 766          | 88423          | 88429          | 88434                   | 88440                   | 88446                  | 88451                  | 88457          | 85463          | 88468                   | 88474                   |
| 767          | 88480          | 88485          | 88491                   | 88497                   | 88502                  | 88508                  | 88513          | 88519          | 88525                   | 88530                   |
| 768          | 88536          | 88542          | 88547                   | 88553                   | 88559                  | 88564                  | 88570          | 88576          | 88581                   | 88587                   |
| 769          | 88593          | 88598          | 88604                   | 88610                   | 88615                  | 88621                  | 88627          | 88622          | 88638                   | 88643                   |
| 770          | 88649          | 88655          | 88660                   | 88666                   | 88672                  | 88677                  | 88688          | 88689          | 88694                   | 88700                   |
| 771          | 88705          | 88711          | 88717                   | 88722                   | 88728                  | 88734                  | 88739          | 88745          | 88750                   | 88756                   |
| 772          | 88762          | 88767          | 88773                   | 88779                   | 88784                  | 88790                  | 88795          | 88801          | 88807                   | 88812                   |
| 773          | 88818          | 88824          | 88829                   | 888 <b>3</b> 5          | 88840                  | 88846                  | 88852          | 88857          | 88863                   | 88868                   |
| 774          | 88874          | 88880          | 88885                   | 88891                   | 88897                  | 88902                  | 88908          | 88913          | . 88919                 | 88925                   |
| 775<br>776   | 88930          | 88936          | 88941                   | 88947                   | 88953                  | 88958                  | 88964          | 88969          | 88975                   | 88981                   |
| 777          | 88986<br>89042 | 88992<br>89048 | 88997<br>89053          | 89003<br>89059          | 89009                  | 89014                  | 89020          | 89025          | 89031                   | 89037                   |
| 778          | 89098          | 89104          | 89109                   | 89116                   | 89064<br>89120         | 89070                  | 89076          | 89081<br>89137 | 89087<br>89143          | 89092                   |
| 779          | 89154          | 89159          | 89165                   | 89170                   | 89176                  | 89126<br>89182         | 89131<br>89187 | 89193          | 89198                   | 89148<br>89204          |
|              |                |                |                         |                         |                        |                        |                |                | !                       | ļ                       |
| 780          | 89209          | 89215          | 89221                   | 89226                   | 89232                  | 89237                  | 89243          | 89248          | 89254                   | 89260                   |
| 781          | 89265          | 89271          | 89276                   | 89282                   | 89287                  | 89293                  | 89298          | 89304          | 89810                   | 89315                   |
| 782<br>783   | 89321<br>89376 | 89326<br>89382 | 89332<br>89387          | 89337<br>8939 <b>3</b>  | 89343<br>89398         | 89348                  | 89354          | 89360          | 89365                   | 89371                   |
| 784          | 89432          | 89437          | 89443                   | 89448                   | 89454                  | 89404<br>89459         | 89409<br>89465 | 89415<br>89470 | 89421<br>89476          | 89426<br>89481          |
| 785          | 89487          | 89492          | 89498                   | 89504                   | 89509                  | 89515                  | 89520          | 89526          | 89531                   | 89537                   |
| 786          | 89542          | 89548          | 89553                   | 89559                   | 89564                  | 89570                  | 89575          | 89581          | 89586                   | 89592                   |
| 787          | 89597          | 89603          | 89609                   | 89614                   | 89620                  | 89625                  | 89631          | 89636          | 89642                   | 89647                   |
| 788          | 89653          | 89658          | 89664                   | 89669                   | 89675                  | 89680                  | 89686          | 89691          | 89697                   | 89702                   |
| <b>. 789</b> | 89708          | 89713          | 89719                   | 89724                   | 89780                  | 89735                  | 89741          | 89746          | 89752                   | 89757                   |
| 790          | 89763          | 89768          | 89774                   | 89779                   | 89785                  | 89790                  | 89796          | 89801          | 89807                   | 89812                   |
| 791          | 89818          | 39823          | 89829                   | 89834                   | 89840                  | 89845                  | 89851          | 89856          | 89862                   | 89867                   |
| 792          | 89873          | 89878          | 89883                   | 89889                   | 89894                  | 89900                  | 89905          | 89911          | 89916                   | 89922                   |
| 798          | 89927          | 89933          | 89938                   | 89944                   | 89949                  | 89955                  | 89960          | 89966          | 89971                   | 89977                   |
| 794          | 89982          | 89988          | 89993                   | 89998                   | 90004                  | 90009                  | 90015          | 90020          | 90026                   | 90031                   |
| 795          | 90037          | 90042          | 90048                   | 90053                   | 90059                  | 90064                  | 90069          | 90075          | 90080                   | 90086                   |
| 796<br>797   | 90091          | 90097          | 90102                   | 90108                   | 90113                  | 90119                  | 90124          | 90129          | 90135                   | 90140                   |
| 798          | 90146          | 90151<br>90206 | 901 <i>5</i> 7<br>90211 | 90162<br>90217          | 90168<br>90222         | 90173<br>90227         | 90179<br>90233 | 90184<br>90238 | 90189<br>90244          | 90195<br>90249          |
| 799          | 90255          | 90260          | 90266                   | 90271                   | 90276                  | 90282                  | 90287          | 90298          | 90298                   | 90304                   |
| 800          | 90309          |                |                         |                         |                        | `                      |                | <u> </u>       |                         |                         |
| · 801        | 90363          | 90314          | 9.520<br>90374          | 90325<br>90380          | 90331<br>9038 <i>5</i> | 90336<br>90390         | 90342<br>90396 | 90347<br>90401 | 90352<br>90407          | 90358<br>90412          |
| 802          | 90417          | 90423          | 90428                   | 90494                   | 90439                  | 90445                  | 90450          | 90455          | 90461                   | 90466                   |
| 803          | 90472          | 90477          | 90482                   | 90488                   | 90493                  | 90499                  | 90504          | 90509          | 90515                   | 90520                   |
| · 804        | 90526          | 90531          | 90536                   | 90542                   | 90547                  | 90553                  | 90558          | 90563          | 90569                   | 90574                   |
| 805          | 90580          | 90585          | 90590                   | 90596                   | 90601                  | 90607                  | 90612          | 90617          | 90623                   | 90628                   |
| 806          | 90634          | 90639          | 90644                   | 90650                   | 90655                  | 90660                  | 90666          | 90671          | 90677                   | 90682                   |
| 807          | 90687          | 90693          | 90698                   | 90703                   | 90709                  | 90714                  | 96720          | 90725          | 90730                   | 90736                   |
| 808          | 90741          | 90747          | 90752                   | 90757                   | 90763                  | 90768                  | 90779          | 90779          | 90784                   | 90789                   |
| 809          | 90795          | 90800          | .90806                  | 90811                   | 90816                  | 90822                  | 90827          | 90832          | 90838                   | 90843                   |
| 810          | 90849          | 90854          | 90859                   | 90865                   | 90870                  | 90875                  | 90881          | 90886          | 90891                   | 90897                   |
| 811          | 90902          | 90907          | 90913                   | 90918                   | 90924                  | 90929                  | 90934          | 90940          | 90945                   | 90950                   |
| 812          | 90956          | 90961          | 90966                   | 90972                   | 90977                  | 90982                  | 90988          | 90993          | 90998                   | 91004                   |
| 813<br>814   | 91009<br>91062 | 91014          | 91020                   | 91025                   | 91030                  | 91036                  | 91041          | 91046          | 91052                   | 91057                   |
| 81 <i>5</i>  | 91062          | 91068<br>91121 | 91073<br>91126          | 91078<br>91132          | 91084<br>91137         | 91089                  | 91094          | 91100          | 91105                   | 91110                   |
| 816          | 91169          | 91174          | 91120                   | 91185                   | 91190                  | 9114 <b>2</b><br>91196 | 91148<br>91201 | 91153<br>91206 | 911 <i>5</i> 8<br>91212 | 91164<br>91 <b>2</b> 17 |
| 817          | 91222          | 91228          | 91233                   | 91238                   | 91243                  | 91249                  | 91254          | 91259          | 91212                   | 91217                   |
| 818          | 91275          | 91281          | 91286                   | 91291                   | 91297                  | 91302                  | 91307          | 91312          | 91318                   | 91323                   |
| 819          | 91328          | 91334          | 91339                   | 91344                   | 91350                  | 91355                  | 91560          | 91365          | 91371                   | 91376                   |
| ~            |                | l              | I                       |                         | <u> </u>               |                        |                |                |                         |                         |

TABLE VIII.
LOGARITHMS OF NUMBERS.

|                    | No. 8200       | 88                      | 300                     |                    |                |                        | Log. 9         | 1381           | 94448          |                |
|--------------------|----------------|-------------------------|-------------------------|--------------------|----------------|------------------------|----------------|----------------|----------------|----------------|
| No.                | 0              | 1                       | 2                       | 3                  | 4              | 5                      | 6              | 7              | 8              | 9              |
| 820                | 91381          | 91387                   | 91392                   | 91397              | 91403          | 91408                  | 91418          | 91418          | 91424          | 91429          |
| 821                | 91434          | 91440                   | 91445                   | 91450              | 91455          | 91461                  | 91466          | 91471          | 91477          | 91482          |
| 822                | 91487          | 91492                   | 91498                   | 91503              | 91508          | 91514                  | 91519          | 91524          | 91529          | 91535          |
| 823                | 91540          | 91545                   | 91551                   | 91556              | 91561          | 91566                  | 91572          | 91577          | 91582          | 91587          |
| 824                | 91593          | 91598                   | 91603                   | 91609              | 91614          | 91619                  | 91624          | 91630          | 91635          | 91640          |
| 825                | 91645          | 91651                   | 91656                   | 91661              | 91666          | 91672                  | 91677          | 91682          | 91687          | 91693          |
| 826                | 91698<br>91751 | 91703<br>91756          | 91709                   | 91714<br>91766     | 91719<br>91772 | 91724<br>91777         | 91730          | 91735<br>91787 | 91740<br>91793 | 91745          |
| 827<br>828         | 91731          | 91808                   | 91761<br>91814          | 91819              | 91824          | 91829                  | 91782<br>91834 | ,91840         | 91845          | 91850          |
| 829                | 91855          | 91861                   | 91866                   | 91871              | 91876          | 91882                  | 91887          | 91892          | 91897          | 91903          |
| 880                | 91908          | 91913                   | 91918                   | <del>-</del> 91924 | 91929          | 91934                  | 91939          | 91944          | 91950          | 91955          |
| 831                | 91960          | 91965                   | 91971                   | 91976              | 91981          | 91986                  | 91991          | 91997          | 92002          | 92007          |
| 832                | 92019          | 92018                   | 92023                   | 92028              | 92033          | 92038                  | 92044          | 92049          | 92054          | 92059          |
| 833                | 92065          | 92070                   | 92075                   | 92080              | 92085          | 92091                  | 92096          | 92101          | 92106          | 92111          |
| 834                | 92117          | 92122                   | 92127                   | 92132              | 92137          | 92143                  | 92148          | 92153          | 92158          | 92163          |
| 835                | 92169          | 92174                   | 92179                   | 92184              | 92189          | 92195                  | 92200          | 92205          | 92210          | 92215          |
| 836                | 92221          | 92226<br>92278          | 92231                   | 92236<br>92288     | 92241          | 92247                  | 92252          | 92257_         | 92262<br>92314 | 92267          |
| 837<br>838         | 92273<br>92324 | 92278                   | 92283<br>92335          | 92288              | 92293<br>92345 | 92298<br>92350         | 92304<br>92355 | 92309<br>92361 | 92314          | 92319<br>92371 |
| . 839              | 92376          | 92381                   | 92387                   | 92392              | 92397          | 92330                  | 92333          | 92412          | 92418          | 92423          |
| 840                | 92428          | 92433                   | 92438                   | 92443              | 92449          | 92454                  | 92459          | . 92464        | 92469          | 92474.         |
| 841                | 92480          | 92485                   | 92490                   | 92495              | 92500          | 92505                  | 92511          | 92516          | 92521          | 92526          |
| 842                | 92531          | 92536                   | 92542                   | 92547              | 92552          | 92557                  | 92562          | 92567          | 92572          | 92578          |
| 843                | 92583          | 92588                   | 92593                   | 92598              | 92603          | 92609                  | 92514          | 92619          | 92624          | 92629          |
| 844                | 92634          | 92639                   | 92645                   | 92650              | 92655          | 92660                  | 9268 <b>5</b>  | 92670          | 92675          | 92681          |
| 845                | 92686          | 92691                   | 92696                   | 92701              | 92706          | 92711                  | 92716          | 92722          | 92727          | 92732          |
| 846                | 92737          | 92742                   | 92747                   | 92752              | 92758          | 92763                  | 92768          | 92773          | 92778          | 92783          |
| 847                | 92788          | 92793                   | 92799                   | 92804              | 92809          | 92814                  | 92819          | 92824          | 92829          | 92834          |
| 848                | 92840<br>92891 | 92845                   | 92850                   | 92855              | 92860          | 92865                  | 92870          | 92875          | 92881<br>92932 | 92886          |
| 849                | 92091          | 92896                   | 92901                   | 92906              | 92911          | 92916                  | 92921          | 92927          | 92932          | 92937          |
| 8 <i>5</i> 0       | 92942          | 92947                   | 92952                   | 92957              | 92962          | 92967                  | 92973.         | 92978          | 92983          | 92988          |
| 851                | 92993          | 92998                   | 93003                   | 93008              | 93013          | 93018                  | 98024          | 93029          | 93034          | 93039          |
| 852                | 93044          | 93049                   | 93054                   | 93059              | 93064          | 93069                  | 93075          | 93080          | 93085          | 93090          |
| 853                | 98095<br>93146 | 93100                   | 93105                   | 93110              | 93115          | 93120                  | 93125          | 93131          | 93136<br>93186 | 93141          |
| 854<br>855         | 93197          | 93151<br>93202          | 931 <i>5</i> 6<br>93207 | 93161<br>93212     | 98166<br>93217 | 93171                  | 93176<br>93227 | 93181<br>93232 | 93130          | 93192<br>93242 |
| 856                | 93247          | 93252                   | 93258                   | 93263              | 93268          | 93273                  | 93278          | 93283          | 93288          | 93293          |
| 857                | 93298          | 93303                   | 93308                   | 93313              | 93318          | 93523                  | 93328          | 93334          | 93339          | 93344          |
| 858                | 93349          | 93354                   | 93359                   | 93364              | 93369          | 99374                  | 93379          | 93384          | 93389          | 93394          |
| 859                | 93399          | 99404                   | 93409 '                 | 93414              | 93420          | 93425                  | 93430          | 93435          | 93440          | 93445          |
| 860                | 93450          | 93455                   | 93460                   | 93465              | 93470          | 93475                  | 93480          | 93485          | 93490          | 93495          |
| 861                | 93500          | 93505                   | 93510                   | 93515              | 93520          | 93526                  | 93531          | 93536          | 93541          | 93546          |
| 862                | 93551          | 93556                   | 93561                   | 93566              | 93571          | 93576                  | 93581          | 93586          | 93591          | 93596.         |
| 863                | 93601          | 93606                   | 93611                   | 93616              | 93621          | 93626                  | 93631          | 93636          | 93641          | 93646          |
| 864                | 93651          | 93656                   | 93661                   | 93666              | 93671          | 93676                  | 93682          | 93687          | 93692<br>93742 | 93697<br>93747 |
| ' 865<br>866       | 93702          | 93707<br>937 <i>5</i> 7 | 93712<br>93762          | 93717<br>93767     | 93722<br>93772 | 93727<br>93777         | 93732<br>93782 | 93737<br>93787 | 93792          | 93797          |
| 867                | 93802          | 93807                   | 93812                   | 93817              | 93822          | 93827                  | 93832          | 93837          | 93842          | 93847          |
| 868                | 95852          | 93857                   | 93862                   | 93867              | 93872          | 93877                  | 93882          | 93887          | 93892          | 93897          |
| 869                | 93902          | 93907                   | 93912                   | 93917              | 93922          | 93927                  | 93932          | 93937          | 93942          | 93947          |
| 870                | 93952          | 93957                   | 93962                   | 93967              | 93972          | 93977                  | 93982          | 93987          | 93992          | 93997          |
| 871                | 94002          | 94007                   | 94012                   | 94017              | 94022          | 94027                  | 94032          | 94037          | 94042          | 94047          |
| 872                | 94052          | 94057                   | 94062                   | 94067              | 94072          | 94077                  | 94082          | 94086          | 94091          | 94096          |
| 878                | 94101          | 94106                   | 94111                   | 94116              | 94121          | 94126                  | 94131          | 94136          | 94141          | 94146          |
| 874<br>875         | 64151          | 94156                   | 94161                   | 94166              | 94171          | 94176                  | 94181          | 94186          | 94191          | 94196<br>94245 |
| 87 <i>5</i><br>876 | 94201<br>94250 | 94206<br>94255          | 94211<br>94260          | 94216<br>94265     | 94221<br>94270 | 94226<br>9427 <i>5</i> | 94231<br>94280 | 94236<br>94285 | 94240<br>94290 | 94245          |
| 877                | 94300          | 94305                   | 94310                   | 94315              | 94320          | 94325                  | 94330          | 94335          | 94340          | 94345          |
| 878                | 94949          | 94354                   | 94359                   | 94364              | 94369          | 94374                  | 94379          | 94384          | 94389          | 94394          |
| 879                | 94399          | 94404                   | 94409                   | 94414              | 94419          | 94424                  | 94429          | 94433          | 94438          | 94443          |
|                    | 0              | 1                       | 2                       | 3                  | 4              | 5                      | 6              | 7              | 8              | 9              |
|                    |                |                         |                         |                    |                |                        |                |                |                |                |

#### TABLE VIII.

|            | <b>No.</b> 8800        | 9-                      | 100                    |                |                |                | Log. 9         | 4448                   |                |                                |
|------------|------------------------|-------------------------|------------------------|----------------|----------------|----------------|----------------|------------------------|----------------|--------------------------------|
| No.        | 0                      | . 1                     | 2                      | 3              | 4              | 5              | 6              | 7                      | 8              | 9                              |
| 880        | 94448                  | 94453                   | 94458                  | 94-163         | 94468          | 94479          | 94478          | 94483                  | 94488          | 94499                          |
| 881        | 94498                  | 94508                   | 94507                  | 94512          | 94517          | 94522          | 94527          | 94532                  | 94537          | 94542                          |
| 882        | 94547                  | 94552                   | 94557                  | 94562          | 94567          | 94571          | 94576          | 94581                  | 94586          | 94591                          |
| 883        | 94596                  | 94601                   | 94606                  | 94611          | 94616          | 94621          | 94626          | 94630                  | 94635          | 94640                          |
| 884        | 94645                  | 94650                   | 94655                  | 94660          | 94665          | 94670          | 94675          | 94680                  | 94685          | 94689                          |
| 885        | 94694                  | 94699                   | 94704                  | 94709          | 94714          | 94719          | 94724          | 94729                  | 94734          | 94738                          |
| 886        | 94743                  | 94748                   | 94753                  | 94758          | 94763          | 94768          | 94773          | 94778                  | 94783          | 94787                          |
| 887        | 94792                  | 94797                   | 94802                  | 94807          | 94812          | 94817          | 94822          | 94827                  | 94832          | 91836                          |
| 888        | 94841                  | 94846                   | 94851                  | 94856          | 94861          | 94866          | 94871          | 94876                  | 94880          | 94885                          |
| 889        | 94890                  | 94895                   | 94900                  | 94905          | 94910          | 94915          | 94919          | 94924                  | 94929          | 94934                          |
| 890        | 94939                  | 94944                   | 94949                  | 94954          | 94959          | 94963          | 94968          | 94973                  | 94978          | 94983                          |
| 891        | 94988                  | 94998                   | 94998                  | 95002          | 95007          | 95012          | 95017          | 95022                  | 95027          | 95032                          |
| 892        | 95036                  | 95041                   | 95046                  | 95051          | 95056          | 95061          | 95066          | 95071                  | 95075          | 95080                          |
| 893        | 95085<br>95134         | 95090                   | 95095                  | 95100          | 95105          | 95109          | 95114          | 95119                  | 95124          | 95129                          |
| 894        |                        | 95189                   | 95143                  | 95148          | 95153          | 95158          | 95163          | 95168                  | 95173<br>95221 | 95177                          |
| 895        | 95182                  | 95187                   | 95192                  | 95197          | 95202          | 95207          | 95211          | 95216                  |                | 95226                          |
| 896<br>897 | 95231<br>95279         | 95236<br>95284          | 95240<br>95289         | 95245<br>95294 | 95250<br>95299 | 95255<br>95303 | 95260<br>95308 | 9526 <b>5</b><br>95313 | 95270<br>95318 | 9527 <b>4</b><br>953 <b>23</b> |
| 898        | 95328                  |                         | 95389                  | 95342<br>95342 | 95299          | 95352          | 95357          | 95361                  | 95366          | 95371                          |
| 899        | 95326                  | 95332<br>95381          | 95386                  | 95342          | 95347          | 95352<br>95400 | 95357<br>95405 | 95361                  | 95306          | 95419                          |
| 1          | <u> </u>               |                         |                        | <u> </u>       |                |                |                |                        |                |                                |
| 900        | 95424                  | 95429                   | 95434                  | 95439          | 95444          | 95448          | 95453          | 95458                  | 95463          | 95468                          |
| 901        | 95472                  | 95477                   | 95482                  | 95487          | 95492          | 95497          | 95501          | 95506                  | 95511          | 95516                          |
| 902        | 95521                  | 95525                   | 95530                  | 95535          | 95540          | 95545          | 95550          | 95554                  | 95559          | 95564                          |
| 903        | 95569<br>95617         | 95574                   | 95578                  | 95583          | 95588          | 95593          | 95598          | 95602                  | 95607<br>95655 | 95612                          |
| 904        | 95665                  | 95622                   | 95626                  | 95631<br>95679 | 95636          | 95641<br>95689 | 95646<br>95694 | 95650<br>95698         | 95703          | 95660<br>95708                 |
| 905<br>906 | 95713                  | 95670<br>95718          | 95674<br>9572 <b>2</b> | 95727          | 95684          | 95737          | 95742          | 95746                  | 95751          | 95756                          |
| 907        | 95761                  | 95766                   | 95770                  | 95775          | 95732<br>95780 | 95785          | 95789          | 95794                  | 95799          | 95804                          |
| 908        | 95809                  | 95813                   | 95818                  | 95823          | 95828          | 95832          | 95837          | 95842                  | 95847          | 95852                          |
| 909        | 95856                  | 95861                   | 95866                  | 95871          | 95873          | 95880          | 95885          | 95890                  | 95895          | 95899                          |
| l          | 95904                  | <u>}</u>                |                        | 95918          |                | 95928          | 95933          |                        | 95942          | 95947                          |
| 910<br>911 | 95952                  | 95909<br>95957          | 95914<br>95961         | 95916          | 95923<br>95971 | 95976          | 95980          | 95938<br>95985         | 95992          | 95995                          |
| 912        | 95999                  | 96004                   | 96009                  | 96014          | 96019          | 96023          | 96028          | 96033                  | 96038          | 96042                          |
| 913        | 96047                  | 96052                   | 96057                  | 96061          | 96066          | 96071          | 96076          | 96080                  | 96085          | 96090                          |
| 914        | 96095                  | 96099                   | 96104                  | 96109          | 96114          | 96118          | 96123          | 96128                  | 96133          | 96137                          |
| 915        | 96142                  | 96147                   | 96152                  | 96156          | 96161          | 96166          | 96171          | 96175                  | 96180          | 96185                          |
| 916        | 96190                  | 96194                   | 96199                  | 96204          | 96209          | 96213          | 96218          | 96223                  | 96227          | 96232                          |
| 917        | 96237                  | 96242                   | 96246                  | 96251          | 96256          | 96261          | 96265          | 96270                  | 96275          | 96280                          |
| 918        | 96284                  | 96289                   | 96294                  | 96298          | 96303          | 96308          | 96313          | 96317                  | 96322          | 96327                          |
| 919        | 96332                  | 96336                   | 96941                  | 96346          | 96350          | 96355          | 96360          | 96365                  | 96369          | 96374                          |
| 920        | 96379                  | 96384                   | 96388                  | 96393          | 96398          | 96402          | 96407          | 96412                  | 96417          | 96421                          |
| 921        | 96426                  | 96431                   | 96435                  | 96440          | 96445          | 96450          | 96454          | 96459                  | 96464          | 96468                          |
| 922        | 96473                  | 96478                   | 96483                  | 96487          | 96492          | 96497          | 96501          | 96506                  | 96511          | 9651 <b>5</b>                  |
| 923        | 96520                  | 96525                   | 96530                  | 96534          | 96539          | 96544          | 96548          | 96553                  | 96558          | 9656¥                          |
| 924        | 96567                  | 96572                   | 96577                  | 96581          | 96586          | 96591          | 96595          | 966CO                  | 96605          | 96609                          |
| 925        | 96614                  | 96619                   | 96624                  | 96628          | 96633          | 96638          | 96642          | 96647                  | 96652          | 96656                          |
| 926        | 96661                  | 96666                   | 96670                  | 96675          | 96680          | 96685          | 96689          | 96694                  | 96699          | 96703                          |
| 927        | 96708                  | 96713                   | 96717                  | 96722          | 96727          | 96731          | 96736          | 96741                  | 96745          | 96750                          |
| 928<br>929 | 967 <i>55</i><br>96802 | 967 <i>5</i> 9<br>96806 | 96764<br>96811         | 96769<br>96816 | 96774<br>96820 | 96778<br>96825 | 96783<br>96830 | 96788<br>96834         | 96792<br>96839 | 96797<br>96844                 |
| 930        | .                      |                         | 96858                  |                | 96867          |                |                | !                      |                | 96890                          |
| 930        | 96848<br>96895         | 96853<br>96900          | 96904                  | 96862<br>96909 | 96914          | 96972<br>96918 | 96876<br>96923 | 96881<br>96928         | 96886<br>96932 | 96987                          |
| 932        | 96942                  | 96946                   | 96951                  | 96956          | 96960          | 96965          | 96970          | 96974                  | 96979          | 96984                          |
| 933        | 95988                  | 96993                   | 96997                  | 97002          | 97007          | 97011          | 97016          | 97021                  | 97025          | 97030                          |
| 934        | 97035                  | 97039                   | 97044                  | 97049          | 97053          | 97058          | 97063          | 97067                  | 97072          | 97077                          |
| 985        | 97081                  | 97086                   | 97090                  | 97095          | 97100          | 97104          | 97109          | 97114                  | 97118          | 97123                          |
| 936        | 97128                  | 97132                   | 97137                  | 97142          | 97146          | 97151          | 97155          | 97160                  | 97165          | 97169                          |
| 937        | 97174                  | 97179                   | 97183                  | 97188          | 97192          | 97197          | 97202          | 97206                  | 97211          | 97216                          |
| 938        | 97220                  | 97225                   | 97230                  | 97204          | 97239          | 97248          | 97248          | 97253                  | 97257          | 97262                          |
| 939        | 97267                  | 97271                   | 97276                  | 97280          | 97285          | 97290          | 97294          | 97299                  | 97304          | 97308                          |
|            | 0                      | 1                       | 2                      | 3              | 4              | 5              | 6              | 7                      | 8              | 9                              |

TABLE VIII.
LOGARITHMS OF NUMBERS.

|               | No. 9400       | 1              | 0000            |       |                |                | Log. 9         | 7313           | <del>9</del> 9996 |                         |
|---------------|----------------|----------------|-----------------|-------|----------------|----------------|----------------|----------------|-------------------|-------------------------|
| No.           | 0              | 1              | 2               | 3     | 4              | 5              | 6              | 7              | 8                 | 9                       |
| 940           | 97313          | 97317          | 97322           | 97327 | 97331          | 97536          | 97340          | 97345          | 97350             | 97354                   |
| 941           | 97359          | 97364          | 97368           | 97378 | 97377          | 97382          | 97387          | 97391          | 97396             | 97400                   |
| 942           | 97405          | 97410          | 97414           | 97419 | 97424          | 97428          | 97433          | 97437          | 97442             | 97447                   |
| <b>94</b> 3   | 97451          | 97456          | 97460           | 97465 | 97470          | 97474          | 97479          | 97483          | 97488             | 97493                   |
| `944          | 97497          | 97502          | 97506           | 97511 | 97516          | 97520          | 97525          | 97529          | 97534             | 97539                   |
| 945           | 97548          | 97548          | .97552          | 97557 | 97562          | 97566          | 97571          | 97575          | 97580             | 97585                   |
| 946           | 97589          | 97594          | 97598           | 97603 | 97607          | 97612          | 97617          | 97621          | 97626             | 97630                   |
| 947           | 97635          | 97640          | 97644           | 97649 | 97653          | 97658          | 97663          | 97667          | 97672             | 97676                   |
| 948           | 97681          | 97685          | 97690           | 97695 | 97699          | 97704          | 97708          | 97713          | 97717             | 97722                   |
| 949           | 97727          | 97731          | 97736           | 97740 | 97745          | 97749          | 97754          | 97759          | 97763             | 97768                   |
| 950           | 97772          | 97777          | 97782           | 97786 | 97791          | 97795          | 97800          | 97804          | 97809             | 97813                   |
| 951           | 97818          | 97823          | 97827           | 97832 | 97836          | 97841          | 97845          | 97850          | 97855             | 97859                   |
| 952           | 97864          | 97868          | 97873           | 97877 | 97882          | 97886          | 97891          | 97896          | 97900             | 97905                   |
| 953           | 97909          | 97914          | 97918           | 97923 | 97928          | 97932          | 97937          | 97941          | 97946             | 97950                   |
| 954           | 97955          | 97959          | 97964           | 97968 | 97973          | 97978          | 97982          | 97987          | 97991             | 97996                   |
| 955           | 98000          | 98005          | 98009           | 98014 | 98019          | 98023          | 98028          | 98032          | 98037             | 98041                   |
| 956           | 98046          | 98050          | 98055           | 98059 | 98064          | 98068          | 98073          | 98078          | 98082             | 98087                   |
| 957           | 98091          | 98096          | 98100           | 98105 | 98109          | 98114          | 98118          | 98123          | 98127             | 98132                   |
| 958           | 98137          | 98141          | 98146           | 98150 | 98155          | 98159          | 98164          | 98168          | 98173             | 98177                   |
| 959           | 98182          | . 98186        | 98191           | 98195 | 98200          | 98204          | 98209          | 98214          | 98218             | 98223                   |
| 960           | 98227          | 98232          | 98236           | 98241 | 98245          | 98250          | 98254          | 98259          | 98263             | 98268                   |
| 961           | 98272          | 98277          | 98281           | 98286 | 98290          | 98295          | 98299          | 98304          | 98308             | 98313                   |
| 962           | 98318          | 98322          | 98327           | 98331 | 98336          | 98340          | 98345          | 98349          | 98354             | 98358                   |
| 963           | 98863          | 98367          | 98372           | 98376 | 98381          | 98385          | 98390          | 98394          | 98399             | 98403                   |
| 964           | 98408          | 98412          | 98417           | 98421 | 98426          | 98430          | 98435          | 98439          | 98444             | 98448                   |
| √ <b>96</b> 5 | 98453          | 98457          | 98462           | 98466 | 98471          | 98475          | 98480          | 98484          | 98489             | 98493                   |
| 966           | 98498          | 98502          | 98507           | 98511 | 98516          | 98520          | 98525          | 98529          | 98534             | 98538                   |
| , 967         | 98543          | 98547          | 98552           | 98556 | 98561          | 98565          | 98570          | 98574          | 98579             | 98583                   |
| 968           | 98588          | 98592          | <b>9</b> 8597   | 98601 | 98605          | 98610          | 98614          | 98619          | 98623             | 98628                   |
| 969           | 98632          | 98637          | 98641           | 98646 | 98650          | 98655          | 98659          | 98664          | 98668             | 98673                   |
| 970           | 98677          | 98682          | 98686           | 98691 | 98695          | 98700          | 98704          | 98709          | 98713             | 98717                   |
| 971           | 98722          | 98726          | 98731           | 98735 | 98740          | 98744          | 98749          | 98753          | 98758             | <b>9876</b> 2 .         |
| 972           | 98767.         | 98771          | 98776           | 98780 | 98784          | 98789          | 98793          | 98798          | 98802             | 98807                   |
| 973           | 98811          | 98816          | 98820           | 98825 | 98829          | 98834          | 98838          | 98843          | 98847             | 98851                   |
| 974           | 98856          | 98860          | 198865          | 98869 | 98874          | 98878          | 98888          | 98887          | 98892             | 98896                   |
| 975           | 98900          | 98905          | 98909           | 98914 | 98918          | 98923          | 98927          | 98932          | 98936             | 98941                   |
| 976           | 98945          | 98949          | 98954           | 98958 | 98963          | 98967          | 98972          | 98976          | 98981             | 98985                   |
| 977           | 98989          | 98994          | 98998           | 99003 | 99007          | 99012          | 99016          | 99021          | 99025             | 99029                   |
| 978           | 99034          | 99038          | 99043           | 99047 | 99052          | 99056          | 99061          | 99065          | 99069             | 99074                   |
| 979           | 99078          | 99083          | 99087           | 99092 | 99096          | 99100          | 99105          | 99109          | 99114             | 99118                   |
| 980           | 99123          | 99127          | 99181           | 99136 | 99140          | 99145          | 99149          | 99154          | 99158             | 99162                   |
| 981           | 99167          | 99171          | 99176           | 99180 | 99185          | 99189          | 99193          | 99198          | 99202             | 99207                   |
| 982           | 99211          | 99216          | 99220           | 99224 | 99229          | 99233          | 99238          | 99242          | 99247             | 99251                   |
| 983           | 99255          | 99260          | 99264           | 99269 | 99278          | 99277          | 99282          | 99286          | 99291             | 99295                   |
| 984           | 99300          | 99304          | 99308           | 99313 | 99317          | 99322          | 99326          | 99830          | 99335             | 99339                   |
| 985           | 99944          | 99348          | 99352           | 99357 | 99361          | 99366          | 99370          | 99374          | 99379             | 99383                   |
| 986           | 99388          | 99392          | 99396           | 99401 | 99405          | 99410          | 99414          | 99419          | 99429             | 99427                   |
| 987           | 99482          | 99436          | 99441           | 99445 | 99449          | 99454          | 99458          | 99463          | 99467             | 99471                   |
| 988           | 99476          |                | 99484           | 99489 | 99493          | 99498          | 99502          | 99506          | 99511             | 99515                   |
| 989           | 99520          | 99524          | 99528           | 99533 | 99537          | 99542          | 99546          | 99550          | 99555             | 99559                   |
| 990           | 99564          | 99568          | 99572           | 99577 | 99581          | 99585          | 99590          | 99594          | 99599             | 99603                   |
| 991           | 99607          | 99612          | 99616           | 99621 | 99625          | 99629          | 99634          | 99638          | 99642             | 99647                   |
| 992           | 99651          | 99656          | 99660           | 99664 | 99669          | 99673          | 99677          | 99682          | 99686             | 99691                   |
| 998           | 99695          | 99699          | 99704           | 99708 | 99712          | 99717          | 99721          | 99726          | 99730             | 99734                   |
| 994           | 99739          | 99743          | 99747           | 99752 | 99756          | 99760          | 99765          | 99769          | 99774             | 99778                   |
| 995           | 99782          | 99787          | 99791           | 99795 | 99800          | 99804          | 99808          | 99813          | 96817             | 99822                   |
| 996           | 99826          | 99830          | 99835.<br>99878 | 99839 | 99843<br>99887 | 99848          | 99852<br>99896 | 99856<br>99900 | 99861<br>99904    | 99865<br>9 <b>9</b> 909 |
| 997           | 99870          | 99874          | 99878           | 99883 | 99887          | 99891<br>99935 | 99939          | 99900          | 99904             | 99909                   |
| 998<br>999    | 99913<br>99957 | 99917<br>99961 | 99922           | 99920 | 99974          | 99978          | 99988          | 99987          | 99991             | 99996                   |
| 309           |                |                |                 |       | ·              |                |                |                |                   |                         |
|               | , 0 .          | 1.             | 2               | 9     | 4              | 5              | ي ۾            | 7              | 8                 | 9                       |

TABLE IX. 9
TO REDUCE POINTS OF THE COMPASS TO DEGREES, AND CONVERSELY.

| North-east<br>Quadrant             | South-east<br>Quadrant.   | Points.   | D. M. S.  | South-west<br>Quadrant.           | North-west<br>Quadrant.                        |
|------------------------------------|---|---|---|-----------------------------------|--|
| North.<br>Nie<br>Nie<br>Nie        | South.<br>SIE<br>SIE<br>SIE   | 0 0<br>0 ½<br>0 ½<br>0 ¾  | 0 0 0<br>2 48 45<br>5 37 30<br>8 26 15                | South.<br>S‡W<br>S‡W<br>S‡W       | North.<br>NIW<br>NIW<br>NIW                    |
| N&E<br>N&E‡E<br>N&E‡E<br>N&E‡E     | S&E<br>S&E↓E<br>S&E↓E<br>S&E↓E  | 1 0<br>1 4<br>1 2<br>1 3  | 11 15 0<br>14 3 45<br>16 52 30<br>19 41 15            | S&W<br>S&W&W<br>S&W&W<br>S&W&W    | N&W<br>N&W\\\\<br>N&W\\\\\\\\\\\\\\\\\\\\\\\\\ |
| NNE<br>NNEIE<br>NNEIE<br>NNEIE     | SSE<br>SSE LE<br>SSE LE<br>SSE LE                                       | 2 0<br>2 1<br>2 2<br>2 3  | 22 30 0<br>25 18 45<br>28 7 30<br>30 56 15            | SSW<br>SSW&W<br>SSW&W<br>SSW&W    | NNW<br>NNWIW<br>NNWIW                          |
| NE&N<br>NE&N<br>NE&N<br>NE&N       | SE&S<br>SE&S<br>SE&S<br>SE&S  | 3 0<br>3 4<br>3 4<br>3 4  | 33 45 0<br>36 33 45<br>39 22 30<br>42 11 15           | SW6S<br>SW4S<br>SW4S<br>SW4S      | NW6N<br>NW4N<br>NW4N<br>NW4N                   |
| NE<br>NEIE<br>NEIE<br>NEIE         | SE<br>SELE<br>SELE<br>SELE  | 4 0<br>4 <del>1</del><br>4 <del>1</del><br>4 <del>1</del><br>4 <del>1</del> | 45 0 0<br>47 48 45<br>50 37 30<br>53 26 15            | SW<br>SW#W<br>SW#W                | NW NW WW W       |
| Nese<br>Nesese<br>Nesese<br>Nesese | SE&E<br>SE&E&E<br>SE&E&E<br>SE&E&E                                      | 5 0<br>5 4<br>5 2<br>5 4  | 56 15 0<br>59 3 45<br>61 52 30<br>64 41 15            | SW&W<br>SW&W&W<br>SW&W&W<br>SW&W  | NW&W<br>NW&W\\\<br>NW&W\\\\\\\\\\\\\\\\\\\\\\\ |
| ENE<br>E&N&N<br>E&N&N<br>E&N&N     | ESE<br>E&S\frac{2}{2}S<br>E&S\frac{1}{2}S<br>E&S\frac{1}{2}S            | 6 0<br>6 ½<br>6 ½<br>6 ½  | 67 30 0<br>70 18 45<br>73 7 30<br>75 56 15            | WSW<br>W6S4S<br>W6S4S<br>W6S4S    | WNW<br>W6N4N<br>W6N4N<br>W6N4N                 |
| E&N<br>E&N<br>E&N<br>E&N<br>East.  | E&S<br>E\frac{1}{2}S<br>E\frac{1}{2}S<br>E\frac{1}{2}S<br>E\frac{1}{2}S | 7 0<br>7 1<br>7 1<br>7 2<br>7 4<br>8 0                                      | 78 45 0<br>81 33 45<br>84 22 30<br>87 11 15<br>90 0 0 | W&S<br>W&S<br>W&S<br>W&S<br>West. | WbN<br>W4N<br>W4N<br>W4N<br>W4N<br>West.       |

TABLE X.

LOGARITHMIC SINES, TANGENTS, AND SECANTS, TO EVERY POINT AND QUARTER POINT OF THE COMPASS.

| Points. | Sine.    | Co-sine.        | Tangent.         | Co-tangent. | Secant     | Co-secant. |                |
|---------|----------|-----------------|------------------|-------------|------------|------------|----------------|
| 0 0 1   | 0.00000  | 10.00000        | 0.00000          | Infinite.   | 10.00000   | Infinite.  | 8 0            |
|         | 8.69080  | 9.99948         | 8.691 <b>\$2</b> | 11.30868    | 10.00052   | 11.30920   | 7 1            |
|         | 8.99130  | 9.99790         | 8.99340          | 11.00660    | 10.00210   | 11.00870   | 7 1            |
|         | 9.16652  | 9.99527         | 9.17125          | 10.82875    | 10.00473   | 10.83348   | 7 1            |
| 1 0     | 9.29024  | 9.991 <i>57</i> | 9.29866          | 10.70134    | 10.00843   | 10.70976   | 7 0            |
| 1 4     | 9.38557  | 9.98679         | 9.39878          | 10.60122    | 10.01321   | 10.61443   | 6 1            |
| 1 1     | 9.46282  | 9.98088         | 9.48194          | 10.51806    | 10.01912   | 10.53718   | 6 1            |
| 1 4     | 9.52749  | 9.97384         | 9.55865          | 10.44635    | 10.02616   | 10.47251   | 6 1            |
| 2 0     | 9.58284  | 9.96562         | 9.61722          | 10.38278    | 10.03438   | 10.41716   | 6 0            |
| 2 1     | 9.63099  | 9 95616         | 9.67483          | 10.32517    | 10.04384   | 10.36901   | 5 <del>1</del> |
| 2 1     | 9.67339  | 9.94543         | 9.72796          | 10.27204    | 10.05457   | 10.32661   | 5 <del>1</del> |
| 2 1     | 9.71105  | 9.93335         | 9.77770          | 10.22230    | 10.06665   | 10.28895   | 5 <del>1</del> |
| 3 0     | 9.74474  | 9.91985         | 9.82489          | 10.17511    | 10.08015   | 10.25526   | 5 0            |
| 8 1     | 9.77503  | 9.90483         | 9.87020          | 10.12980    | 10.09517   | 10.22497   | 4 <del>1</del> |
| 8 1     | 9.80236  | 9.88819         | 9.91417          | 10.08583    | 10.11181   | 10.19764   | 4 <del>1</del> |
| 8 1     | 9,82708  | 9.86979         | 9.95729          | 10.04271    | 10.13021   | 10.17292   | 4 <del>1</del> |
| 40      | 9,84949  | 9,84949         | 10,00000         | 10.00000    | 10,15051   | 10.15051   | 4 0            |
|         | Co-sine. | Sine.           | Co-tangent.      | Tangent.    | Co-secant. | Secant.    | Points.        |

| 14       |                        |                        | TABL                       | E XI.                  | •                 |                                 |          |
|----------|------------------------|------------------------|----------------------------|------------------------|-------------------|---------------------------------|----------|
|          | L                      | OGARITHMI              |                            |                        | ND SECANT         | 's. '                           |          |
| M.       | Sine.                  | Co-Sine.               | Tangent.                   | Co-tangent.            | Secant.           | Co-secant.                      |          |
| 0        | 0.00000                | 10.00000               | 0.00000                    | Infinite.              | 10.00000          | Infinite.                       | 60       |
| 1        | 6 . 46373              | 00000                  | 6 . 46372                  | 13 . 53627             | 00000             | 13.53627                        | 59<br>58 |
| 2        | 76476                  | 00000                  | 76476<br>9408 <i>5</i>     | 23524<br>0591 <i>5</i> | 00000             | 23524<br>05915                  | 57       |
| 4        | 94085<br>7.06579       | 00000                  | 7.06579                    | 12 . 93421             | 00000             | 12.93421                        | 56       |
| 5        | 16270                  | 00000                  | 16270                      | 83730                  | 00000             | 83730                           | 55       |
| 6        | 24188                  | 00000                  | 24188                      | 75812                  | 00000             | 75812                           | 54       |
| 7        | 30882                  | 00000                  | <b>\$</b> 0882             | 69118                  | 00000             | 69118<br>69318                  | 53<br>52 |
| 8        | 36682<br>41797         | 00000<br>00000         | 36682<br>41797             | 63318<br>58203         | 00000             | 58203                           | 51       |
| 10       | 7.46373                | 10.00000               | 7.46373                    | 12.58627               | 10.00000          | 12.53627                        | 50       |
| 11       | 50512                  | 00000                  | 50512                      | 49488                  | 00000             | 49488                           | 49       |
| 12       | 54291                  | 00000                  | 54291                      | 45709                  | 00000             | 45709                           | 48       |
| 13       | 57767                  | 00000                  | 57767                      | 42233                  | 00000             | 42233<br>3901 <i>5</i>          | 47<br>46 |
| l4<br>l5 | 6098 <i>5</i><br>63982 | 00000                  | 60986<br>63982             | 39014<br>36018         | 00000             | \$601 <b>8</b>                  | 45       |
| 16       | 66784                  | 00000                  | <b>6</b> 678 <b>5</b>      | 33215                  | 00000             | 3321 <b>6</b>                   | 44       |
| 17       | 69417                  | 9.99999                | 69418                      | 30582                  | 00001             | 30 <i>5</i> 8 <b>3</b>          | 49       |
| 18       | 71900                  | 99999                  | 71900                      | 28100                  | 00001             | 28100                           | 42       |
| 19       | 74248                  | 99999                  | 74248                      | .25752                 | 00001             | 25752                           | 41       |
| 50       | 7.76475                | 9.99999                | 7.76476                    | 12.23524               | 10.00001          | 12.29525                        | 40       |
| 21       | 78594                  | 99999                  | 78595                      | 21405                  | 00001             | 21406<br>1938 <i>5</i>          | 39<br>38 |
| 22<br>23 | 8061 <i>5</i><br>82545 | 99999<br>99999         | 80615<br>82546             | 19385<br>17454         | 00001<br>00001    | 17455                           | 37       |
| 24       | 84393                  | 99999                  | 84394                      | 15606                  | 00001             | 15607                           | 36       |
| 25       | 86166                  | 99999                  | 86167                      | 13833                  | 00001             | 1383 <b>4</b>                   | 85       |
| 26       | 87870                  | <b>9</b> 9999          | 87871                      | 12129                  | 00001             | 12130                           | 34       |
| 27       | 89 <i>5</i> 09         | 99999                  | 89510                      | 10490                  | 00001             | 10491                           | 33       |
| 28<br>29 | 91088<br>92612         | 99999<br>99998         | 91089<br>92613             | 08911<br>07387         | 00001<br>00002    | 0891 <i>2</i><br>073 <b>8</b> 8 | 32<br>31 |
| 30       | 7.94084                | 9.99998                | 7.94086                    | 12.05914               | 10.00002          | 12.05916                        | 30       |
| 31       | 95508                  | 99998                  | 95510                      | 04490                  | 00002             | 04492                           | 29       |
| 32       | 96887                  | 99998                  | 96889                      | 03111                  | 00002             | 03113                           | 28       |
| 33       | 98223                  | 99998                  | 98225                      | 01775                  | 00002             | 01777<br>00480                  | 27<br>26 |
| 34<br>35 | 99520                  | 96998                  | 99522<br>8.00781           | 00478                  | 00002             | 11.99221                        | 25<br>25 |
| 36       | 8.00779<br>02002       | 99998<br>999 <b>98</b> | 02004                      | 97996                  | 00002             | 97998                           | 24       |
| 37       | 03192                  | 99997                  | 03194                      | 96806                  | 00003             | 96808                           | 23       |
| 38       | 04350                  | 99997                  | 04353                      | 95647                  | 00003             | 956 <b>5</b> 0                  | 22       |
| 39       | 05478                  | 99997                  | 05481                      | 94519                  | 00003             | 94522                           | 21       |
| 40       | 8.06578                | 9.99997<br>99997       | 8.06581                    | 11.93419<br>92347      | 10.00003<br>00003 | 11.93422<br>92350               | 20<br>19 |
| 41<br>42 | 07650<br>0869 <b>6</b> | 99997                  | 07653<br>08700             | 91300                  | 00003             | 91304                           | 18       |
| 13       | 09718                  | 99997                  | 09722                      | 90278                  | 00003             | 90282                           | 17       |
| 14       | 10717                  | 99996                  | 10720                      | 89280                  | 00004             | 89283                           | 16       |
| 45       | 11693                  | 99996                  | 11696                      | 88304                  | 00004             | 88307                           | 15       |
| 16<br>17 | 12647                  | 99996                  | 12651                      | 87349<br>86415         | 00004             | 87353<br>86419                  | 14<br>13 |
| 48       | 13581<br>14495 -       | 99996<br>99996         | 13585<br>14500             | 86415<br>85500         | 00004<br>00004    | 8 <i>55</i> 0 <i>5</i>          | 12       |
| 19       | 15391                  | 99996                  | 15395                      | 84605                  | 00004             | 84609                           | 11       |
| 50       | 8.16268                | 9 . 99995              | 8.16273                    | 11 .83727              | 10.00005          | 11.83732                        | 10       |
| 51       | 17128                  | 99995                  | 17193                      | 82867                  | 00005             | .82872<br>82029                 | 9        |
| 52<br>53 | 17971<br>18798         | 99995<br>9999 <i>5</i> | 17976<br>1880 <del>4</del> | 82024<br>81196         | 00005<br>00005    | 82029<br>81202                  | 7        |
| 54       | 19610                  | 99993<br>99993         | 19616                      | 80384                  | 00005             | 80390                           | 6        |
| 55       | 20407                  | 99994                  | 20413                      | 79587                  | 00006             | 79593                           | 5        |
| 56       | 21189                  | 99994                  | 21195                      | 78805                  | 00006             | 78811                           | 4        |
| 57       | 21958                  | 99994                  | 21964                      | 78036                  | 00006             | 78042                           | 3 2      |
| 58<br>59 | 22713<br>23456         | 99994<br>99994         | 22720<br>28462             | - 77280<br>76538       | 00006<br>00006    | 77287<br>76 <del>544</del>      | 1        |
| 30       | 24186                  | 99993                  | 24192                      | 75808                  | 00007             | 75814                           | ō        |
| _        |                        |                        |                            |                        |                   |                                 |          |

Co-tangent.

Sine.

Co-sine.

Tangent.

Co-secant.

Secant.

TABLE XI.

LOGARITHMIC SINES, TANGENTS, AND SECANTS.

1 Degree.

|          | 1 Degree.                 |                    |                                 |                            |                   |                        |          |
|----------|---------------------------|--------------------|---------------------------------|----------------------------|-------------------|------------------------|----------|
| M.       | Sine.                     | Co-sine.           | Tangent.                        | Co-tangent.                | Secant.           | Co-secant.             |          |
| 0        | 8,24186                   | 9.99993            | 8.24192                         | 11.75808                   | 10.00007          | 11.75814               | 60       |
| 1        | 24903                     | 99998              | 24910                           | 75090                      | 00007             | 75097                  | 59       |
| 2        | 25609                     | 99996              | 25616                           | 74984                      | 00007             | 74391                  | 58       |
| 3        | 26304                     | 99993              | 26312                           | 73688                      | 00007             | 73696                  | 57       |
| 4        | 26988                     | 99992              | 26996                           | 79004                      | 00008             | 73012                  | 56       |
| 5<br>6   | 27661                     | 99992              | 27669                           | 72331                      | 00008             | 72839                  | 55<br>54 |
| 7        | 28324                     | 99992              | 28332                           | 71668                      | 00008             | 71676                  | 58       |
| 8        | 28977<br>29621            | 99992<br>99992     | 28986<br>29629                  | 7101 <del>4</del><br>70371 | 00008             | 71023<br>7037 <b>9</b> | 52       |
| . 9      | 30255                     | 99991              | 30263                           | 69737                      | 00009             | - 69745                | 51       |
|          |                           |                    |                                 |                            |                   |                        |          |
| 10       | 8,90879                   | 9.99991            | 8.30888                         | 11.69112                   | 10 . 00009        | 11.69121               | 50       |
| 11<br>12 | 81495                     | 99991              | 31 <i>5</i> 0 <i>5</i>          | 68495                      | 00009             | 68505                  | 49<br>48 |
| 13       | 32103<br>32702            | 99990              | 32112                           | 67888                      | 00010             | 67897<br>67898         | 47       |
| 14       | 33292                     | 99990<br>99990     | 32711                           | 67289<br>6669 <b>8</b>     | 00010<br>00010    | 67298<br>66708         | 46       |
| 15       | 33292<br>33875            | 99990              | 33886<br>33886                  | 66114                      | 00010             | 66125                  | 45       |
| 16       | 34450                     | 99989              | 34461                           | 65539                      | 00011             | 65 <i>55</i> 0         | 44       |
| 17       | 35018                     | 99989              | 35029                           | 64971                      | 00011             | 64982                  | 49       |
| 18       | <b>3</b> 5578             | 99989              | 35590                           | 64410                      | 00011             | 64422                  | 42       |
| 19       | <b>3</b> 6131             | 99989              | 36143                           | 63857                      | 00011             | 63869                  | 41       |
| 20       | 8.36678                   | 0 00000            | 9 00000                         | 11 00011                   | 10, 00010         | 11 60000               | 40       |
| 21       | 37217                     | 9 . 99988<br>99988 | 8.36689<br>37229                | 11.63311<br>62771          | 10.00012<br>00012 | 11 . 63322<br>62783    | 39       |
| 22       | 377 <i>5</i> 0            | 99988              | 37762                           | 62238                      | 00012             | 62250                  | 38       |
| 23       | 38276                     | 99987              | 38289                           | 61711                      | 00012             | . 61724                | 37       |
| 24       | 38796                     | 99987              | 38809                           | .61191                     | 00013             | 61204                  | 36       |
| 25       | 39310                     | 99987              | 39323                           | 60677                      | 00013             | 60690                  | 35       |
| 26       | 39818                     | 99986              | 39832                           | 60168                      | 00014             | 60182                  | 34       |
| 27       | 40320                     | 99986              | 40934                           | 59666                      | 00014             | 59680                  | 33       |
| 28       | 40816                     | 99986              | 40830                           | 59170                      | 00014             | 5918 <b>4</b>          | 32       |
| 29       | 41307                     | 99985              | 41321                           | 58679                      | 00015             | <b>5</b> 8693          | 31       |
| 30       | 8.41792                   | 9.99985            | 8.41807                         | 11.58193                   | 10.00015          | 11.58208               | 30       |
| 31       | 42272                     | 99985              | 42287                           | 57713                      | 00015             | <i>5</i> 7728          | 29       |
| 32       | 42746                     | 99984              | 42762                           | 57238                      | 00016             | 57254                  | 28       |
| 33       | 43216                     | 99984              | 43232                           | 56768                      | 00016             | 56784                  | 27       |
| 34       | <b>4</b> 3680             | 99984              | 43696                           | 5630 <del>4</del>          | 00016             | 56320                  | 26       |
| 35       | 44139                     | 99983              | 44156                           | 55844                      | 00017             | <i>55</i> 861          | 25       |
| 36       | 44594                     | 99983              | 44611                           | 55389                      | 00017             | 55406                  | 24       |
| 37<br>38 | 45044                     | 99983              | 45061                           | 54939                      | 00017             | 54956                  | 23<br>22 |
| 39       | 45489<br>45930            | 99982              | 45507<br>45948                  | 54493<br>54052             | 00018             | 54511<br>54070         | 21       |
|          | 40900                     | 99982              | 10910                           | 34002                      | . 0.010           |                        |          |
| 40       | 8 . 46366                 | 9.99982            | 8.46985                         | 11.53615                   | 10.00018          | 11.53634               | 20       |
| 41       | 46798                     | 99981              | 46817                           | 53183                      | 00019             | 53201                  | 19       |
| 42       | 47226                     | 99981              | 47245                           | 52755                      | 00019             | 52774                  | 18       |
| 43<br>44 | 47650                     | 99981              | 47669                           | 52331                      | 00019             | 52350<br>51001         | 17       |
| 45       | 48069<br>48485            | 99980              | 48089<br>48 <i>5</i> 0 <i>5</i> | 51911<br>51495             | 00020<br>00020    | 51931<br>51515         | 16<br>15 |
| 46       | 48896                     | 99980<br>99979.    | 48917                           | 51083                      | 00020             | 51104                  | 14       |
| 47       | 49304                     | 99979<br>99979     | 49325                           | 50675                      | 00021             | <i>5</i> 0696          | 13       |
| 48       | 49708                     | 99979              | 49729                           | 50271                      | 00021             | 50292                  | 12       |
| 49       | 50108                     | 99978              | 50130                           | 49870                      | 00022             | 49892                  | 11       |
| 50       | 0 50504                   |                    | 9 50507                         | 11 40470                   | 10 00000          | 11 40406               | 10       |
| 51       | 8 <b>.</b> 50504<br>50897 | 9.99978            | 8 . 50527<br>50920              | 11 . 49473.<br>49080       | 10.00022<br>00023 | 11 . 49496<br>49103    | 9        |
| 52       | 50897<br>51287            | 99977<br>99977     | 51310                           | 48690                      | 00023             | 48713                  | 8        |
| 53       | 51673                     | 99977              | 51696                           | 48304                      | 00023             | 48327                  | 7        |
| 54       | 52055                     | 99976              | 59079                           | 47921                      | 00024             | 47945                  | 6        |
| 55       | 52434                     | 99976              | 52459                           | 47541                      | 00024             | 47566                  | 5        |
| 56       | 52810                     | 99975              | 52835                           | 47165                      | 00025             | 47190                  | 4        |
| 57       | 53183                     | 99975              | 53208                           | <b>46</b> 792              | 00025             | 46817                  | 3        |
| 58       | 53552                     | 99974              | <i>5</i> 3578                   | 46422                      | 00026             | 46148                  | 2        |
| 59       | <i>5</i> 8919             | 99974              | 53945                           | 46055                      | 00026             | 46081                  | 1        |
| 60       | 54282                     | 99974              | 54308                           | 45692                      | 00026             | 45718                  | 0.       |
|          | Co-sine.                  | Sine.              | Co-tangent.                     | Tangent.                   | Co-secant.        | Secant.                | M.       |
|          |                           |                    |                                 |                            |                   |                        | ıf       |

TABLE XI.

LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|           |                  |                  | 2 De           | grees.            |                |                       |          |
|-----------|------------------|------------------|----------------|-------------------|----------------|-----------------------|----------|
| М.        | Sine.            | Co-sine.         | Tangent.       | Co-tangent.       | Secant.        | Co-secant.            |          |
| 0         | 8 . 54282        | 9.99974          | 8.54308        | 11.45692          | 10.00026       | 11 . 45718            | 60       |
| 1         | 54642            | 99978.           | 54669          | 45331             | 00027          | 45958                 | 59       |
| 2 3       | 54999<br>55354   | 99973            | 55027          | 44973             | 00027<br>00028 | 45001<br>44646        | 58<br>57 |
| 4         | 55705            | 99972<br>99972   | 55382<br>55734 | 44618<br>44266    | 00028          | 44295                 | 56       |
| 5         | 56054            | 99971            | 56083          | 43917             | 00029          | 48946                 | 55       |
| 6         | 56400            | 99971            | 56429          | 43571             | 00029          | 48600                 | 54       |
| 7         | 56743            | 99970            | <i>\$</i> 6773 | 43227             | 00030          | 43257                 | 53       |
| 8         | 57084            | 99970            | 57114          | 42886             | 00030          | 42916                 | 52<br>51 |
| 9         | 57421            | 99969            | 57452          | 42548             | 00031          | 42579                 |          |
| 10        | 8.57757          | 9.99969          | 8.57788        | 11.42212          | 10.00031       | 11.42243.             | 50       |
| 11        | 58089<br>58419   | 99968 -<br>99968 | 58121<br>58451 | 41879<br>41549    | 00032<br>00032 | 41911<br>41581        | 49<br>48 |
| 13        | 58747            | 99967            | 58779          | 41221             | 00033          | 41253                 | 47       |
| 14        | 59072            | 99967            | 59105          | 40895             | 00033          | 40928                 | 46       |
| 15        | 59395            | 99967            | 59428          | 40572             | 00033          | 40605                 | 45       |
| 16        | 5971 <i>5</i>    | 99966            | 59749          | 40251             | 00034          | 40285                 | 44       |
| 17        | 60033            | 99966            | 60068          | 39932             | <b>0</b> 0034  | 39967                 | 43       |
| 18        | 60349            | 99965            | 60384          | 39616             | 00035          | 39651                 | 42       |
| 19        | 60662            | 99964            | 60698          | 39302             | 00036          | 39338                 | 41.      |
| 20        | 8.60973          | 9.99964          | 8.61009        | 11.38991          | 10.00036       | 11.39027              | 40       |
| 31        | 61282            | 99963            | 61319          | 58681             | 00037          | 38718                 | 39       |
| 22        | 61589            | 99963            | 61626          | 3837 <del>4</del> | 00037          | 38411                 | 38       |
| 23        | 61894            | 99962            | 61931          | 38069             | 00038          | 38106<br>37804        | 37       |
| 24        | 62196<br>62497   | 99962<br>99961   | 62234<br>62535 | 37766<br>37465    | 00038          | 37503                 | 36<br>35 |
| 25<br>26  | 62795            | 99961            | 62834          | 37166             | 00039          | 37205                 | 34       |
| 27        | 63091            | 99960            | 63131          | 36869             | 00040          | 36909                 | 33       |
| 28        | 63385            | 99960            | 63426          | 36574             | 00040          | 36615                 | 32       |
| 29        | . 63 <b>67</b> 8 | 99959            | 63718          | 36282             | 00041          | S632 <b>2</b>         | 31       |
| 30        | 8.63968          | 9.99959          | 8.64009        | 11.35991          | 10.00041       | 11.36032              | 30       |
| 31        | 64256            | 99958            | 64298          | 35702             | 00042          | 3574 <del>4</del>     | 29       |
| 32        | 64548            | 99958            | 64585          | 35415             | 00042          | 35457                 | 28       |
| 33        | 64827            | 99957            | 64870          | 35130             | 00043          | 3517 <b>3</b>         | 27       |
| 34        | 65110<br>65391   | 99956            | 65154          | 34846             | 00044          | 34890<br>34609        | 26       |
| 35<br>36  | 65670            | 99956<br>99955   | 65435<br>65715 | 34565<br>34285    | 00044<br>00045 | 3433O                 | 25<br>24 |
| 37        | 65947            | 99955            | 65993          | 34007             | 00045          | 94053                 | 23       |
| 38        | 66223            | 99954            | 66269          | <b>3</b> 3731     | 00046          | <b>3</b> 377 <b>7</b> | 22       |
| 39        | 66497            | 99954            | 66548          | 33457             | 00046          | <b>3</b> 3 <b>503</b> | 21       |
| 10        | 8.66769          | 9 . 99953        | 8.66816        | 11.93184          | 10.00047       | 11.33231              | 20       |
| 11        | 67039            | 99952            | 67087          | 32913             | 00048          | 32961                 | 19       |
| 12        | 67308            | 99952            | 67356          | 32 <b>644</b>     | 00048          | 32692                 | 18       |
| 18        | 67575            | 99951            | 67624          | 32376             | 00049          | <b>32425</b>          | 17       |
| 14        | 67841<br>68104   | 99951            | 67890          | 32110             | 00049          | 32159<br>31896        | 16       |
| 15<br>16  | 68367            | 99950 .<br>99949 | 68154<br>68417 | 31846<br>\ 31583  | 00050          | 31633                 | 15<br>14 |
| 17        | 68627            | 99949            | 68678          | \$1503<br>\$1522  | 00051          | 31373                 | 13       |
| 18        | 68886            | 99948            | 68938          | 31062-            | 00052          | 31114                 | 12       |
| 19        | 69144            | 99948            | 69196          | 30804             | 00052          | 30856                 | ii       |
| 50        | 8 . 69400        | 9.99947          | 8 . 69453      | 11 . 90547        | 10.00053       | 11.30600              | 10       |
| 51        | 69654            | 99946            | 69708          | 30292             | 00054          | 30346                 | 9        |
| 12        | 69907            | 99946            | 69962          | 30038             | 00054          | 30093                 | 8        |
| 53        | 70159            | 99945            | 70214          | 29786             | 00055          | 29841                 | 7        |
| 54        | 70409            | 99944            | 70465          | 29535             | 00056          | 295 <b>91</b>         | 6        |
| i5<br>i6  | 70658 \<br>70905 | 99944            | 70714          | 29286             | 00056          | 29342<br>29095        | 5        |
| 57        | 71151            | 99943<br>99942   | 70962<br>71208 | 29038<br>28792    | 00057<br>00058 | 28849                 | 4        |
| 18        | 71395            | 99942            | 71453          | 28547             | 00058          | 28605                 | 3 2      |
| <b>i9</b> | 71638            | 99941            | 71697          | 28903             | 00059          | 28362                 | î        |
| 10        | 71880            | 99940            | 71940          | 28060             | 00060          | 28120                 | ō        |
|           | Co-sine.         | Sine.            | Co-tangent.    | Tangent.          | Co-secant.     | Secant.               | M.       |
|           |                  |                  | ·              | egrees.           |                |                       | I: ,     |
|           |                  |                  |                |                   |                |                       |          |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|                         | LOGARITHMIC SINES, TANGENTS, AND SECANTS. |                                 |                |                   |  |                        |          |  |  |
|-------------------------|---|---------------------------------|----------------|-------------------|--|------------------------|----------|--|--|
| 3.6                     | <u> </u>                                  |                                 |                | egrees.           |  |                        | -        |  |  |
| М.                      | Sine                                      | Co-sine.                        | Tangent.       | Co-tangent.       | Secant.                                      | Co-secant.             |          |  |  |
| 0                       | 8.84358                                   | 9.99894                         | 8.84464        | 11.15536          | 10.00106                                     | 11.15642               | 60       |  |  |
| 1                       | 84539                                     | 99893                           | 84646          | 15354             | 00107  | 15461                  | 59       |  |  |
| 2                       | 84718                                     | 99892                           | 84826          | 15174             | ,00108                                       | 15282                  | 58       |  |  |
| 3                       | <b>84</b> 897                             | 99891                           | 85006          | 14994             | 00109  | 15103                  | 57       |  |  |
| 4                       | 85075                                     | 99891                           | <b>8</b> 5185  | 14815             | 00109  | 14925                  | 56       |  |  |
| 5                       | <b>85</b> 252                             | 99890                           | 8 <i>5</i> 363 | 14637             | 00110  | 14748                  | 55       |  |  |
| 6                       | 85429                                     | 99889                           | 85540          | 14460             | . 00111                                      | 14571                  | 54       |  |  |
| 7<br>8                  | 85605                                     | 99888                           | 85717          | 14283             | 00112  | 14395                  | 53<br>52 |  |  |
| 9                       | 85780                                     | 99887                           | 85893          | 14107             | (a)113                                       | 14220                  | 51       |  |  |
|                         | 85955                                     | 99886                           | 86069          | 13931             | 00114  | 14045                  | 31       |  |  |
| 10                      | 8.86128                                   | 9.99885                         | 8.86243        | 11.13757          | 10.00115                                     | 11 . 13872             | 50       |  |  |
| . 11                    | 86301                                     | 99884                           | 86417          | 13583             | 00116  | 13699                  | 49       |  |  |
| 12                      | 86474                                     | 99883                           | 86591          | 13409             | 00117  | 13526                  | 48       |  |  |
| 13                      | 86645                                     | 99882                           | 86763          | 13237             | 00118  | 13355                  | 47       |  |  |
| 14                      | <b>86</b> 816                             | 99881                           | 86935          | 13065             | 00119  | 13184                  | 46       |  |  |
| 15                      | 86987                                     | 99880                           | 87106          | 12894             | 00120  | 13013                  | 45       |  |  |
| 16                      | 87156                                     | 99879                           | 87277          | 12723             | 00121  | 12844                  | 44       |  |  |
| 17<br>18                | 87325<br>87404                            | 99879                           | 87447<br>97616 | 12558             | 00121  | 12675                  | 43       |  |  |
| 19                      | 87494                                     | 99878                           | . 87616        | 12384<br>12215    | 00122<br>00123                               | 12506<br>12339         | 41       |  |  |
|                         | 87661                                     | 99877                           | 87785          | 12219             | 00123  | 12339                  | .'       |  |  |
| 20                      | 8 . 87829                                 | 9.99876                         | 8.87953        | 11.12047          | 10.00124                                     | 11.12171               | 40       |  |  |
| 21                      | 87995                                     | 9987 <i>5</i>                   | 88120          | 11880             | 00125  | 12005                  | 39       |  |  |
| 22                      | 88161                                     | 99874                           | 88287          | 11713             | 00126  | 11839                  | 38       |  |  |
| 23                      | 88326                                     | 99873                           | 88453          | 11547             | 00197  | . 11674                | 37       |  |  |
| 24                      | 88490                                     | 99872                           | 88618          | 11882             | 00128  | 11510                  | 36       |  |  |
| 25                      | 88654                                     | 99871                           | 88783          | 11217             | 00129  | 11346                  | 35       |  |  |
| 26                      | 88817                                     | 99870                           | 88948          | 11052             | 00130  | 11183                  | 34<br>33 |  |  |
| 27<br>28                | 88980                                     | 99869                           | 89111          | 10889<br>10726    | 00131<br>00132                               | 11020<br>10858         | 32       |  |  |
| 29                      | 89142<br>89304                            | 99868<br>99867                  | 89274<br>89437 | 10720             | 00132  | 10696                  | 31       |  |  |
|                         | 03304                                     | 33001                           | 03101          |                   |  | 10030                  | .'       |  |  |
| 30                      | 8.89464                                   | 9 . 99866                       | 8.89598        | 11.10402          | 10.00134                                     | 11.10536               | 30       |  |  |
| 31                      | 89624                                     | <b>9</b> 986 <b>5</b>           | 89760          | 10240             | 00135  | 10375                  | 29       |  |  |
| 32                      | 89784                                     | 99864                           | 89920          | 10080             | 00136  | 10216                  | 28       |  |  |
| 33                      | 89943                                     | 99863                           | 90080          | 09920             | 00137  | 10057                  | 27<br>26 |  |  |
| 34                      | 90102                                     | 99862                           | 90240          | 09760<br>09601    | 00138  | 09898                  | 25       |  |  |
| 8 <i>5</i><br><b>36</b> | 90260<br>90417                            | 99861<br>99860                  | 90399<br>90557 | 09443             | 00139<br>00140                               | 09740<br>09583         | 24       |  |  |
| 37                      | 90574                                     | 99859                           | 90715          | 09285             | 00141  | 09383                  | 23       |  |  |
| 38                      | 90730                                     | 99858                           | 90872          | 09128             | 00142  | 09270                  | 22       |  |  |
| 39                      | 90885                                     | 99857                           | 91029          | 08971             | 00143  | 09115                  | 21       |  |  |
|                         |   |                                 | <del></del>    |                   |  |                        | .'       |  |  |
| 40                      | 8.91040                                   | 9.99856                         | 8.91185        | 11.08815          | 10.00144                                     | 11.08960               | 20       |  |  |
| 41                      | 91195                                     | 99855                           | 91340          | \08660            | 00145  | 08805                  | 19       |  |  |
| 42                      | 91349                                     | 99854                           | 91495          | 08505             | 00146  | 08651                  | 18       |  |  |
| 43<br>44                | 91 <i>5</i> 02<br>91 <i>655</i>           | 998 <b>5</b> 3<br>998 <b>52</b> | 91650<br>91803 | 08350<br>08197    | 00147<br>00148                               | 08498<br>0834 <i>5</i> | 17       |  |  |
| 44<br>45                | 91633                                     | 998 <i>5</i> 1                  | 91957          | 08043             | 00148  | 08193                  | 15       |  |  |
| 46                      | 91959                                     | 99850                           | 92110          | 07890             | 00150  | 08041                  | 14       |  |  |
| 47                      | 92110                                     | 99848                           | 92262          | 07738             | 00152  | 07890                  | 13       |  |  |
| 48                      | 92261                                     | 99847                           | 92414          | 07 <i>5</i> 86    | 00153  | 07739                  | 12       |  |  |
| 49                      | 92411                                     | 99846                           | 92565          | 07435             | 00154  | 07589                  | 11       |  |  |
|                         |   | 0.000:5                         |                | 11 07004          |  | 11 07 100              | 10       |  |  |
| 50                      | 8.92561                                   | 9.99845                         | 8.92716        | 11.07284<br>07134 | 10.00155                                     | 11.07439               | 9        |  |  |
| 51<br>52                | 92710<br>928 <i>5</i> 9                   | 99844<br>99843                  | 92866<br>93016 | 07134<br>06984    | 00156  | 07290<br>07141         | 8        |  |  |
| 52<br>53                | 93007                                     | 99842                           | 93165          | 06835             | , 001 <i>5</i> 7<br>, <b>0</b> 01 <i>5</i> 8 | 06993                  | 7        |  |  |
| 54                      | 93154                                     | 99841                           | 9 <b>3</b> 313 | 06687             | 00159  | 06846                  | 6        |  |  |
| 55                      | 93301                                     | 99840                           | 93462          | 06538             | 00160  | 06699                  | 5        |  |  |
| 56                      | 93448                                     | 99839                           | 93609          | 06891             | 00161  | 06552                  | 4        |  |  |
| 57                      | 93594                                     | 99838                           | 93756          | 06244             | 00162  | 06406                  | 8        |  |  |
| 58                      | 93740                                     | 99837                           | 93903          | 06097             | 00163  | .06260                 | 2        |  |  |
| 59                      | 93885                                     | 99836                           | 940-19         | 05951             | 00164  | 06115                  | 1        |  |  |
| 60                      | 94030                                     | 99834                           | 94195          | 05805             | 00166  | 05 <b>9</b> 70         | 0        |  |  |
|                         | Co-sine.                                  | Sine                            | Co-tangent.    | Tangent.          | Co-secant.                                   | Secant.                | M.       |  |  |
| ŀ                       |   |                                 | 85 The         |                   | Jo-Jacanii.                                  |                        |          |  |  |
|                         |   |                                 |                |                   |  |                        |          |  |  |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|      | · · ·             | 00111111111     |                       | 11(01)         |               | 7,         |     |
|------|-------------------|-----------------|-----------------------|----------------|---------------|------------|-----|
| 1    |                   |                 |                       | grees.         |               |            | · · |
| M    | Sine.             | 'Co-sine.       | Tangent.              | Co tangent.    | Secant.       | Co-secant. | ł   |
| -    | 0.04000           | 0.0004          | 0.04105               | 11 05005       | 10 00166      | 11 05070   | 60  |
| 0    | 8.94030           | 9.99834         | 8.94195               | 11.05805       | 10 .00166     | 11.05970   | ,   |
| 1    | 94174             | 99833           | 94340                 | 05660          | 00167         | 05826      | 59  |
| 2    | 94317             | 99832           | 94485                 | 05515          | <b>00</b> 168 | 05683      | 58  |
| 8    | 94461             | 99831           | 94630                 | 05370          | 00169         | 05539      | 57  |
| 4    | 94603             | 99830           | 94773                 | 05227          | 00170         | 05397      | 56  |
| 5    | 94746             | 99829           | 94917                 | 05083          | 00171         | 05254      | 55  |
| 6    | 94887             | 99828           | 95060                 | 04940          | 00172         | 05113      | 54  |
| 7    | 95029             | 99827           | 95202                 | 04798          | 00173         | 04971      | 53  |
| 8    |                   |                 |                       |                |               |            | 52  |
|      | 95170             | 99825           | 95344                 | 04656          | 00175         | 04830      |     |
| 9    | 95310             | 99824           | 95486                 | 04514          | 00176         | 04690      | 51  |
| 10   | 8.95450           | 0 00000         | 8.95627               | 11.04378       | 10.00177      | 11.04550   | 50  |
|      |                   | 9.99828         |                       |                |               |            |     |
| . 11 | 95589             | 99822           | 95767                 | 04233          | 00178         | 04411      | 49  |
| 12   | 95728             | 99821           | 95908                 | 04092          | 00179         | 04272      | 48  |
| 13   | 95867             | 99820           | 96047                 | 03953          | 00180         | 04133      | 47  |
| 14   | 96005             | 99819           | 96187                 | 03813          | 00181         | 03995      | 46  |
| 15   | 96143             | 99817           | 96325                 | 03675          | 00183         | 03057      | 45  |
| 16   | 96280             | 99816           | 96464                 | 03536          | 00184         | 03720      | 44  |
| 17   | 96417             | 99815           | 96602                 | 03398          | 00185         | 03583      | 43  |
|      |                   |                 |                       |                | 00186         | 03447      | 42  |
| 18   | 96553             | 99814           | 96739                 | 03261          |               |            |     |
| 19   | 96689             | 99813           | 96877                 | 03123          | 00187         | 08311      | 41  |
|      | 9 00005           | 0.00010         | 9 07010               | 11.02987       | 10 00198      | 11.03175   | 40  |
| 20   | 8.96825           | 9.99812         | 8.97013               |                | 10.00188      | 03040      | 39. |
| 21-  | 96960             | 99810           | 97150                 | 02850          | 00190         |            |     |
| 22   | 97095             | 99809           | 97285                 | 02715          | 00191         | 02905      | 38  |
| 23   | 9722 <del>9</del> | 99808           | 97421                 | <b>~</b> 02579 | 00192         | 02771      | 87  |
| 24   | 97863             | 99807           | 97556                 | 02444          | 00193         | 02637      | 36  |
| 25   | 97496             | 99806           | 97691                 | 02309          | 00194         | 02504      | 35  |
| 26   | 97629             | 99804           | 97825                 | 02175          | 00196         | 02371      | 34  |
| 27   | 97762             | 99803           | 97959                 | 02041          | 00197         | 02238      | 33  |
| 28   |                   |                 |                       | •              | 00198         | 02106      | 32  |
| 1 1  | 97894             | 99802           | 98092                 | 01908          |               | 01974      |     |
| 29   | 98026             | - <b>99</b> 801 | 98225                 | 01775          | 00199         | 01974      | 31  |
| 30   | 8.98157           | 9.99800         | 8 . 98358             | 11.01642       | 10.00200      | 11.01843   | 30  |
|      | 98288             |                 |                       |                | 00202         | 01712      | 29  |
| 31   |                   | 99798           | 98490                 | 01510          |               |            | 28  |
| 82   | 98419             | 99797           | 98622                 | 01378          | 00203         | 01581      |     |
| 38   | 98549             | 99796           | 98753                 | 01247          | 00204         | 01451      | 27  |
| 34   | 98679             | 99795           | 98884                 | 01116          | 00205         | 01321      | 26  |
| 35   | 98808             | 99793           | <b>99</b> 01 <i>5</i> | 00983          | 00207         | 01192      | 25  |
| 36   | 98937             | 99792           | 99145                 | 00855          | 00208         | 01063      | 24  |
| 37   | 99066             | 99791           | 99275                 | 00725          | 00209         | 00934      | 23  |
| 38   | 99194             | 99790           | 99405                 | 00595          | 00210         | 00806      | 22  |
| 39   | 99322             | 99788           | 99534                 | 00466          | 00212         | 00678      | 21  |
| 33   | 33022             | 33100           | 330.41                | 00100          | 0.7212        |            |     |
| 40   | 8 . 99450         | 9.99787         | 8.99662               | 11.00338       | 10.00218      | 11.00550   | 20  |
| 41   | 99577             | 99786           | 99791                 | 00209          | 00214         | 00423      | 19  |
| 42   | 99704             | 99785           | 99919                 | 00081          | 00215         | 00296      | 18  |
| 1    |                   |                 |                       |                |               | . 00170    | 17  |
| 43   | 99830             | 99783           | 9.00046               | 10 . 99954     | 00217         | 00044      | 16  |
| 44   | 99956             | 99782           | 00174                 | 99826          | 00218         |            |     |
| 45   | 9.00082           | 99781           | 00301                 | 99699          | 00219         | 10.99918   | 15  |
| 46   | 00207             | 99780           | 00427                 | 99573          | 00220         | 99793      | 14  |
| 47   | 00332             | 99778           | 00553                 | 99447          | 00222         | 99668      | 13  |
| 48   | 00456             | 99777           | 00679                 | ` 99321        | 00223         | 99544      | 12  |
| 49   | 00581             | 99776           | 00805                 | 99195          | 00224         | 99419      | 11  |
|      |                   |                 | !                     |                |               |            | -   |
| 50   | 9.00704           | 9.99775         | 9.00930               | 10.99070       | 10.00225      | 10.99296   | 10  |
| 51   | 00828             | 99773           | 01055                 | 98945          | 00227         | 99172      | 9 ' |
| 52   | 00951             | 99772           | 01179                 | 98821          | 00228         | 99049      | 8   |
| 53   | 01074             | 99771           | 01303                 | 98697          | 00229         | 98926      | 7   |
|      |                   |                 |                       |                |               | 98884      | 6   |
| 54   | 01196             | 99769           | 01427                 | 98573          | 00231         |            | 5   |
| 55   | 01318             | 99768           | 01550                 | 98450          | 00252         | 98682      |     |
| 56   | 01440             | 99767           | 01673                 | 98327          | 00233         | 98560      | 4   |
| 57   | 01 <i>5</i> 61    | 99765           | 01796                 | 982Q4          | 00235         | 98489      | 3   |
| 58   | 01682             | 99764           | 01918                 | 98082          | 00236         | 98318      | 2   |
| 59   | 01803             | 99763           | 02040                 | 97960          | 00237         | 98197      | 1   |
| 60   | 01928             | 99761           | 02162                 | 97838          | 00239         | 98077      | 0   |
| -    |                   |                 |                       |                |               | <u> </u>   |     |
| 11   | Co-sine.          | Sine.           | Co-tangent.           | Tangent.       | Co-secant.    | Secant.    | M.  |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

| ſ        |                                |                        | 6 De                   | grees.                 |                        |                        |          |
|----------|--------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|----------|
| M.       | Sine.                          | Co-sine.               | Tangent.               | Co-tangent.            | Secant.                | Co-secant.             | _        |
| 0        | 9.01923                        | 9.99761                | 9.02162                | 10.97838               | 10.00239               | 10.98077               | 60       |
| 1        | 02043                          | 99760                  | 02288                  | 97717                  | 00240                  | 97957                  | 59       |
| 2        | 02163                          | 99759                  | 02404                  | 97596                  | 00241                  | 97837                  | 58       |
| 3 4      | 02283                          | 99757                  | 02525                  | 97475                  | 00243                  | 97717                  | 57       |
| 5        | 02 <b>402</b><br>025 <b>20</b> | 99756<br>99755         | 02645<br>02766         | 97355<br>97234         | 00244<br>00245         | 97598<br>97480         | 56<br>55 |
| 6        | 02639                          | 99753                  | 02885                  | 97115                  | 00243                  | 97361                  | 54       |
| 7        | 02757                          | 99752                  | 03005                  | 96995                  | 00248                  | 97243                  | 53       |
| 8        | 02874                          | 99751                  | 03124                  | 96876                  | 00249                  | 97126                  | 52       |
| 9        | 02992                          | 99749                  | 03242                  | 96758                  | 00251                  | 97008                  | 51       |
| 10       | 9.03109                        | 9.99748                | 9.03361                | 10.96639               | 10.00252               | 10.96891               | 50       |
| 11       | 03226                          | 99747                  | 03479                  | 96521                  | 00253                  | 96774                  | 49       |
| 12       | 03342                          | 99745                  | 03597                  | 96403                  | 00255                  | 96658                  | 48       |
| 18       | 03458                          | 99744                  | 03714                  | 96286                  | 00256                  | 96542                  | 47       |
| 14       | 03574                          | 99742                  | 03832                  | 96168                  | 00258                  | 96426                  | 46       |
| 15<br>16 | 93690<br>0380 <i>5</i>         | 99741<br>99740         | 03948<br>0406 <i>5</i> | 96052<br>95935         | 00259                  | 96310                  | 45<br>44 |
| 17       | 03920                          | 99738                  | 04181                  | 95819                  | 00260<br>00262         | 96195<br>96080         | 43       |
| 18       | 04034                          | 99737                  | 0:297                  | 95703                  | 00263                  | 95966                  | 42       |
| 19       | 04149                          | 99736                  | 04413                  | 95587                  | 00264                  | 95851                  | 41       |
| 40       | 9.04262                        |                        | 9.04528                |                        |                        |                        | 40       |
| 20<br>21 | 04376                          | 9.99734<br>99733       | 04643                  | 10.95472<br>95857      | 10.00266<br>00267      | 10 . 95738<br>95624    | 39       |
| 22       | 04490                          | 99731                  | 04758                  | 95242                  | 00269                  | 95510                  | 38       |
| 23       | 04603                          | 99730                  | 04873                  | 95127                  | 00270                  | 95397                  | 37       |
| 24       | 04715                          | 99728                  | 04987                  | 95013                  | 00272                  | 95285                  | 36       |
| 25       | 04828                          | 99727                  | 05101                  | 94899                  | 00273                  | 95172                  | 35       |
| 26       | 04940                          | 99726                  | 05214                  | 94786                  | 00274                  | 9 <i>5</i> 060         | 34       |
| 27       | 05052                          | 99724                  | 05328                  | 94672                  | 00276                  | <b>9494</b> 8          | 33       |
| 28       | 05164                          | 99723                  | 05441                  | 94559                  | 00277                  | 94836                  | 32       |
| 29       | 05275                          | 99721                  | 05553                  | 94447                  | 00279                  | 94725                  | 31       |
| 30       | 9.05386                        | 9.99720                | 9.05666                | 10.94334               | 10.00280               | 10.94614               | 30       |
| 31       | 05497                          | 99718                  | 05778                  | 94222                  | 00282                  | 94503                  | 29       |
| 32       | 05607                          | 99717                  | 05890                  | 94110                  | 00283                  | 94393                  | 28       |
| 33       | 05717                          | 99716                  | 06002                  | 93998                  | 00284                  | 94283                  | 27       |
| 34<br>35 | 0582 <b>7</b><br>0593 <b>7</b> | 99714<br>99713         | 06113<br>06224         | 93887<br>9377 <b>6</b> | 00286<br>00287         | 94173<br>94063         | 26<br>25 |
| 36       | 06046                          | 99711                  | 06335                  | 93665                  | 00289                  | 93954                  | 24       |
| 37.      | 06155                          | 99710                  | 06445                  | 93 <i>55<b>5</b></i>   | 00290                  | 93845                  | 23       |
| 38       | 06264                          | 99708                  | 06556                  | 93444                  | 00292                  | 93736                  | 22       |
| 39       | 06372                          | 99707                  | 06666                  | 93334                  | 00293                  | 93628                  | 21       |
| 40       | 9.06481                        | 9.99705                | 9.06775                | 10 . 93225             | 10.00295               | 10.93519               | 20       |
| 41       | 06589                          | 99704                  | 06885                  | 93115                  | 00296                  | 93411                  | 19       |
| 42       | 06696                          | 99702                  | 06994                  | 93006                  | 00298                  | 93304                  | 18       |
| 43       | 06804                          | 99701                  | 07103                  | 92897                  | 00299                  | 93196                  | 17       |
| 44       | 06911                          | 99699                  | 07211                  | 92789                  | 00301                  | 93089                  | 16       |
| 45<br>46 | 07018                          | £9698<br>49696         | 07320<br>07498         | 92680                  | 00302                  | 92982                  | 15<br>14 |
| 47       | 07124<br>07231                 | 99696<br>99695         | 07428<br>0753 <b>6</b> | 92572<br>92464         | 00804<br>0030 <i>5</i> | 92876<br>92 <b>769</b> | 13       |
| 48       | 07337                          | 99693                  | 07643                  | 92357                  | 00303                  | 92663                  | 12       |
| 49       | 07442                          | 99692                  | 07751                  | 92249                  | 00308                  | 92558                  | 11       |
| 50       | 9.07548                        | 9.99690                | 9.07858                | 10.92142               | 10.00310               | 10.92452               | 10       |
| 51       | 07653                          | 99689                  | 07964                  | 92036                  | 00311                  | 92347                  | 9        |
| 52       | 07758                          | 99687                  | 08071                  | 91929                  | 00315                  | 92242                  | 8        |
| 53       | 07863                          | 99686                  | 08177                  | 91823                  | 00314                  | 92137                  | 7        |
| 54       | 07968                          | 99684                  | 08283                  | 91717                  | 00316                  | 92032                  | 6        |
| 55       | 08072                          | . 99683                | 08389                  | 91611                  | . 00317                | 91928                  | 5        |
| 56       | 08176                          | 99681                  | 08495                  | 91 <i>5</i> 0 <i>5</i> | 00319                  | 91824                  | 4        |
| 57       | 08280<br>08383                 | 99680                  | 08600<br>08705         | 91400                  | 00320                  | 91720                  | 8        |
| 58<br>59 | 08383                          | 99678<br><b>9</b> 9677 | 08705                  | 91295<br>91190         | 00322                  | 91617<br>91514         | i        |
| 60       | 03589                          | 99675                  | 08914                  | 91086                  | 00325                  | 91411                  | Ô        |
|          |                                |                        |                        |                        | <u> </u>               | ļ                      | M.       |
|          | Co-sine.                       | Sine.                  | Co-tangent.            | Tangent.               | Co secant.             | . Secant.              | - WI.    |
| -        | -                              |                        | 83 De                  | grees.                 |                        |                        | <u> </u> |

TABLE XI.

LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|          | LOGARITHMIC SINES, TANGENTS, AND SECANTS.                                      |                        |                                  |                                 |                                       |                        |          |  |  |
|----------|--|------------------------|----------------------------------|---------------------------------|---------------------------------------|------------------------|----------|--|--|
|          | 7 Degrees. 1. Sine.   Co-sine.   Tangent.   Co-tangent.   Secant.   Co-secant. |                        |                                  |                                 |                                       |                        |          |  |  |
| M.       | . Sine.  | . Co-sine.             | Tangent.                         | Co-tangent.                     | Secant.                               | Co-secant.             | <u> </u> |  |  |
| 0        | 9.08589  | 9.99675                | 9.08914                          | 10.91086                        | 10.00325                              | 10.91411               | 60       |  |  |
| 1        | 08692  | 99674                  | 09019                            | 90981                           | 00326                                 | 91308                  | 59       |  |  |
| 2        | 08795  | 99672                  | 09123                            | 90877                           | 00328                                 | 91205                  | 58       |  |  |
| 3        | 08897  | 99670                  | 09227                            | 90773                           | 00330                                 | 91109                  | 57<br>56 |  |  |
| 4 5      | 06999<br>09101   | 99669<br>99667         | 09330<br>09434                   | 90670<br>90566                  | 00331<br>00333                        | 91001<br>90899         | 55       |  |  |
| 6        | 09202  | 99666                  | 09537                            | 90463                           | 00333                                 | 90798                  | 54       |  |  |
| 7        | 09304  | 99664                  | 09640                            | 90360                           | 00336                                 | 90696                  | 53       |  |  |
| 8        | 09405  | 99663                  | 09742                            | 90258                           | 00337                                 | 90595                  | 52       |  |  |
| 9        | 09506  | 99661                  | 09845                            | <b>9</b> 01 <i>55</i>           | 00339                                 | 90494                  | 51       |  |  |
| 10       | 9.09606  | 9 . 99659              | 9.09947                          | 10.90053                        | 10.00941                              | 10.90394               | 50       |  |  |
| 14       | 09707  | 99658                  | 10049                            | 89951                           | 00342<br>00344                        | 90299                  | 49<br>48 |  |  |
| 12       | 09807<br>09907   | 99656<br>99655         | 101 <i>5</i> 0<br>102 <i>5</i> 2 | 89850<br>89748                  | 00345                                 | 90193<br>90093         | 47       |  |  |
| 14       | 10006  | 99658                  | 10252                            | 896 <del>4</del> 7              | 00343                                 | 89994                  | 46       |  |  |
| 15       | 10106  | 99651                  | 10454                            | 89546                           | 00349                                 | 89894                  | 45       |  |  |
| 16       | 10205  | 99650                  | 10555                            | 89445                           | 003 <b>50</b>                         | 89795                  | 44       |  |  |
| 17       | 10304  | 99648                  | 10656                            | 8934 <del>4</del>               | 00352                                 | 89696                  | 48       |  |  |
| 18       | 10402  | 99647                  | 10756                            | 89244                           | 00353                                 | 89598                  | 42       |  |  |
| 19       | 10501  | 99645                  | 10856                            | 89144                           | 00355                                 | 89499                  | 41       |  |  |
| 20       | 9 . 10599<br>10697   | 9.99648                | 9.10956                          | 10 . 89044<br>88 <del>944</del> | 10 . 003 <i>5</i> 7<br>003 <i>5</i> 8 | 10.89401               | 40       |  |  |
| 21<br>22 | 10697  | 99642<br><b>9</b> 9640 | 11056 \<br>11155                 | 88845                           | 00360                                 | 89303<br>8920 <i>5</i> | 39<br>38 |  |  |
| 29       | 10893  | 99638                  | 11133                            | 88746                           | 00362                                 | 89107                  | 37       |  |  |
| 24       | 10990  | 99637                  | 11353                            | 88647                           | 00363                                 | 89010                  | 36       |  |  |
| 25       | 11087  | 99685                  | 11452                            | 885 <del>4</del> 8              | 00365                                 | 88913                  | 35       |  |  |
| 26       | 11184  | 99633                  | 11 <i>5</i> 51                   | 88449                           | 00367                                 | 88816                  | 94       |  |  |
| 27       | 11281  | 99632                  | 11649                            | 88351                           | 00368                                 | 88719                  | 33       |  |  |
| 28       | 11977  | 99630                  | 11747                            | 88253                           | 00370                                 | 886 <b>2</b> 3         | 32       |  |  |
| 29       | 11474  | 99629                  | 11845                            | 88155                           | 00371                                 | 88526                  | 31       |  |  |
| 30       | 9.11570  | 9.99627                | 9.11943                          | 10 . 88057                      | 10 . 00373                            | 10.88430               | 50       |  |  |
| 31       | 11666  | 99625                  | 12040                            | 87960                           | 00875                                 | 88334                  | 29       |  |  |
| 32<br>33 | 11761<br>11 <b>8</b> 57  | 99624<br>99622         | 12138<br>1 <b>223</b> 5          | 87862<br>87765                  | 00376<br>00378                        | 88239<br>88143         | 28<br>27 |  |  |
| 34       | 11952  | 99620                  | 1233                             | 87668                           | 00378                                 | 88048                  | 26       |  |  |
| 35       | 12047  | 99618                  | 12428                            | 87572                           | 00382                                 | 87953                  | 25       |  |  |
| 36       | 12142  | 99617                  | 12525                            | 87475                           | 00383                                 | 87858                  | 24       |  |  |
| 37       | 12236  | 99615                  | 12621                            | 87379                           | 00385                                 | 87764                  | 23       |  |  |
| 38       | 12331  | .99613                 | 12717                            | 87283                           | 00387                                 | 87669                  | 22       |  |  |
| 39       | 12425  | 99612                  | 12811                            | 87187                           | 00388                                 | 87 <b>5</b> 75         | 21       |  |  |
| 40       | 9.12519  | 9.99610                | 9.12909                          | 10.87091                        | 10.00390                              | 10 . 87481             | 20       |  |  |
| 41<br>42 | 12612<br>12706   | 99608<br>99607         | 13004                            | 86996<br>86901                  | 00392                                 | 87388                  | 19<br>18 |  |  |
| 43       | 12799  | 99605                  | 19099<br>13194                   | 86901<br>86806                  | 00393<br>0039 <i>5</i>                | 87294<br>87201         | 17       |  |  |
| 44       | 12892  | 99603                  | 13289                            | 86711                           | 00397                                 | 87108                  | 16       |  |  |
| 45       | 12985  | 99601                  | 13384                            | 86616                           | 00399                                 | 8701 <i>5</i>          | 15       |  |  |
| 46       | 13078  | 99600                  | 13478                            | 86522                           | 00400                                 | 86922                  | 14       |  |  |
| 47       | 18171  | 99598                  | 18578                            | 86427                           | 00402                                 | 86829                  | 13       |  |  |
| 48       | 13263  | 99596                  | 13667                            | 86333                           | 00404                                 | 86787                  | 12       |  |  |
| 49       | 13355  | 99595                  | 13761                            | 86239                           | 00405                                 | 86645                  | 11       |  |  |
| 50       | 9.13447  | 9.99593                | 9.13854                          | 10.86146                        | 10.00407                              | 10 . 86553             | 10       |  |  |
| 51<br>52 | 13 <b>5</b> 39<br>13630  | 99591                  | 13948                            | 86052<br>85059                  | 00409                                 | 86461<br>86870         | 8        |  |  |
| 58       | 13030  | 99589<br>99588         | 14041<br>14134                   | 85959<br>85866                  | 00411<br>00412                        | 86370<br>86278         | 7        |  |  |
| 54       | 13813  | 99586                  | 14227                            | 8 <i>5</i> 773                  | 00414                                 | 86187                  | 6        |  |  |
| 55       | 18904  | 99584                  | 14320                            | 8 <i>5</i> 680                  | 00416                                 | 86096                  | - 5      |  |  |
| 56       | 13994  | 99582                  | 14412                            | 85588                           | 00418                                 | 86006                  | 4        |  |  |
| 57       | 14085  | 99581                  | 14504                            | 85496                           | 00419                                 | <b>85</b> 91 <b>5</b>  | 8        |  |  |
| 58       | . 14175  | 99579                  | 14597                            | 85403                           | 00421                                 | 8582 <i>5</i>          | . 2      |  |  |
| 59       | 14206  | 99577                  | 14688                            | 85312                           | 00423                                 | 85734                  |          |  |  |
| 50       | 14866  | 99575                  | 14780                            | 85220                           | 00425                                 | 85644                  | 0        |  |  |
|          | Co-sine.   | Sine.                  | Co-tangent.                      | Tangent.                        | Co-secant.                            | Secant.                | M.       |  |  |
| ı        |  |                        | 90 Th                            | OFFERE                          |                                       |                        | I        |  |  |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|          |                        | OGARITAM                | 8 De                             |                        | IND SECAN      |                |          |
|----------|------------------------|-------------------------|----------------------------------|------------------------|----------------|----------------|----------|
| M.       | Sine.                  | Co-sine.                |                                  | Co-tangent.            | Secant.        | Co-secant.     |          |
| 0        | 9.14956                | 9 . 99575               | 9.14780                          | 10.85220               | 10.00425       | 10.85644       | 60       |
| 1        | 14445                  | 99573                   | 14872                            | 85128                  | 00426          | <b>855</b> 55  | 59       |
| 2        | 14595                  | 99572                   | 14963                            | 85037                  | 00428          | 85465          | 58       |
| 3        | 1 <b>46</b> 24         | 99570                   | 15054                            | 84946                  | 00430          | 85376          | 57       |
| 4        | 14714                  | 99568                   | 15145                            | 84855                  | 00482          | 85286          | 56       |
| 8        | 14803                  | 99566                   | 15286                            | 84764                  | 00434          | 85197          | 55       |
| 6        | 14891                  | 99565                   | 15327                            | 84673                  | 00485          | 85109          | 54<br>53 |
| 7        | 14980                  | 99563                   | 15417                            | 84583                  | 00487          | 85020          | 59<br>59 |
| 8        | 15069                  | 99561                   | 1 <i>55</i> 08<br>1 <i>55</i> 98 | 84492<br>84402         | 00489<br>00441 | 84931<br>84843 | 51       |
| 9        | 15157                  | 99559                   |                                  | 10 . 84312             | 10.00449       | 10 . 84755     | 50       |
| 10       | 9.15245                | 9.99557                 | 9.15688<br>15777                 | 84223                  | 00444          | 84667          | 49       |
| 12       | 15898<br>15421         | 99556<br>99554          | 15867                            | 84133                  | 00446          | 84579          | 48       |
| 15       | 15508                  | 99552                   | 15956                            | 84044                  | 00448          | 84492          | 47       |
| 14       | 15596                  | 99550                   | 16046                            | 83954                  | 00450          | 84404          | 46       |
| 15       | 15683                  | 99548                   | 16135                            | 83865                  | CO452          | 84317          | 45       |
| 16       | 15770                  | 99546                   | 16224                            | 83776                  | 00454          | 84230          | 44       |
| 17       | 15857                  | 99545                   | 16312                            | 89688                  | 00455          | 84149          | 49       |
| 18       | 15944                  | 99543                   | 16401                            | 83599                  | 00457          | 84056          | 42       |
| 19       | 16050                  | 99541                   | 16489                            | 83511                  | 00459          | 83970          | .41      |
| 20       | 9.16116                | 9 . 99539               | 9.16577                          | 10 . 89429             | 10.00461       | 10 . 83884     | 40       |
| 21       | 16203                  | 99537                   | 16665                            | 83335<br>83247         | 00463          | 83797<br>83711 | 39<br>38 |
| 22       | 16289                  | 99535                   | 16753<br>16841                   | 83159                  | 00467          | 83626          | 37       |
| 23<br>24 | 16374                  | 99533<br>99532          | 16928                            | 89072                  | 00468          | 89540          | 36       |
| 25       | 16460<br>16545         | 99532<br>995 <b>3</b> 0 | 17016                            | 82984                  | 00470          | 83455          | 35       |
| 26       | 16631                  | 99528                   | 17103                            | 82897                  | 00472          | 89969          | 34       |
| 27       | 16716                  | 99526                   | 17190                            | 82810                  | 00474          | 83284          | 33       |
| 28       | 16801                  | 99524                   | 17277                            | 82723                  | 00476          | 83199          | 32       |
| 29       | 16886                  | 99522                   | 17363                            | . <b>82</b> 637        | 00478          | 83114          | 31       |
| 30       | 9.16970                | 9 . 99520               | 9.17450                          | 10 . 82550             | 10.00480       | 10 . 83030     | 30       |
| 31       | 17055                  | 99518                   | 17536                            | 82464                  | 00482          | 82945          | 29       |
| 32       | 17139                  | 99517                   | 17622                            | 82978                  | 00483          | 82861          | 28       |
| 33       | 17223                  | 99515                   | 17708<br>17794                   | 82292<br>82206         | 00485<br>00487 | 82777<br>82693 | 27<br>26 |
| S4<br>S5 | 17307<br>17391         | 99513<br>99511          | 17880                            | 82120                  | 00489          | 82609          | 25       |
| 36       | 17474                  | 99509                   | 17965                            | 82035                  | 00491          | 82526          | 24       |
| 37       | 17538                  | 99507                   | 18051                            | 81949                  | 00493          | 82442          | 23       |
| 38       | 17641                  | 99505                   | 18136                            | 81864                  | 00495          | 82359          | 22       |
| 99       | 17724                  | 99503                   | 18221                            | <b>817</b> 79          | 00497          | 82276          | 21       |
| 40       | 9.17807                | 9.99501                 | 9.18306                          | 10.81694               | 10.00499       | 10 . 82193     | 20       |
| 41       | 17890                  | 99499                   | 18391                            | 81609                  | 00501          | 82110          | 19       |
| 42       | 17973                  | 99497                   | 18475                            | 81525                  | 00503          | 82027          | 18       |
| 45       | 18055                  | 99495                   | 18560                            | 81440<br>91956         | 00505<br>00506 | 81945<br>81863 | 17<br>16 |
| 44 45    | 19137<br>18220         | 99494<br><b>99</b> 492  | 18644<br>18728                   | 81356<br>81272         | 00508          | 81780          | 15       |
| 46       | 18302                  | 99492<br>99490          | 18812                            | 81188                  | 00510          | 81698          | 14       |
| 47       | 18383                  | 99488                   | 18896                            | 81104                  | 00512          | 81617          | 15       |
| 48       | 18465                  | 99486                   | 18979                            | 81021                  | 00514          | 81535          | 12       |
| 49       | 18547                  | 99484                   | 19063                            | 80937                  | 00516          | 81453          | 11       |
| 50       | 9.18628                | 9.99482                 | 9.19146                          | 10 . 80854             | 10.00518       | 10.81372       | 10       |
| 5 t      | 18709                  | 9 <del>9</del> 480      | , 19229                          | 80771                  | 00520          | 81291          | 9        |
| 52       | 18790                  | 99478                   | 19512                            | 80688                  | 00522          | 81210          | 8        |
| 53       | 18871                  | 99476                   | 19395                            | 80605                  | 00524          | 81129          | 7        |
| 54       | 18952                  | 99474                   | 19478                            | 80522`                 | 00526          | 81048          | 6        |
| 55       | 19033                  | 99472                   | 19561                            | 80439                  | 00528          | 80967          | 5        |
| 56<br>57 | 19119                  | 99470                   | 19643<br>19725                   | 80357<br>80975         | 00530          | 82887<br>80807 | . 5      |
| 57<br>58 | 1919 <b>3</b><br>19273 | 99468<br>99466          | 19807                            | 8027 <i>5</i><br>80193 | 00532<br>00534 | 80727          | 3        |
| 59       | 19275                  | 99464                   | 19889                            | 80111                  | 00586          | 80647          | 3        |
| 60       | 19433<br>19433         | 99462                   | 19971                            | 80029                  | 00588          | 80567          | 0        |
|          | Co-sine.               | Sine.                   | Co-tangent.                      | Tangent.               | Co-secant.     | Secant.        | M.       |
|          |                        |                         |                                  | ертеея.                |                |                | Ī.       |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|            |                | <del>-, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del> | 9 De                    | grees.               |                   |                         |            |
|------------|----------------|---|-------------------------|----------------------|-------------------|-------------------------|------------|
| M.         | Sine.          | Co-sine.  | Tangent.                | Co-tangent.          | Secant.           | Co-secant.              |            |
| 9          | 9,19433        | 9.99462   | 9.19971                 | 10.80029             | 10.00588          | 10 . 80567              | 60         |
| 1          | 19513          | . 99460   | 20053                   | 79947 .              | 00540             | 80487                   | 59 *       |
| 2          | 19592          | 99458   | 20134                   | 79864                | 00542             | 80408                   | 58         |
| 8          | 19672          | , 99456   | 20216                   | 79784                | 00544             | 80328                   | 57         |
| 1 4        | 19751          | 99454   | 20297                   | 79703                | 00546             | 80249                   | 56         |
| 5          | 19830          | 99452   | 20378                   | 79622                | 00548             | 80170                   | 55         |
| 6 7        | 19909          | 99450   | 20459                   | 79541                | 00550             | 80091                   | 54         |
| 8          | 19988          | 99448   | 20540                   | 79460                | 00552             | 80012                   | 53         |
| 9          | 20067          | 99446   | 20621                   | 79379                | 00554             | 79938                   | 5 <u>2</u> |
|            | 20145          | 99144   | 20701                   | 79299                | 00556             | 79855                   | 51         |
| 10<br>11   | 9.20223        | 9-99442   | 9 · 20782<br>20862      | .10 . 79218<br>79198 | 10.00558<br>00560 | 10.79777                | <i>5</i> 0 |
| 12         | 20302<br>20380 | 99440   | 20862 20942             | 79198<br>79058       | 00560             | 79698<br>79620          | 49         |
| 18         | 20380<br>20458 | 99438<br>99436                                    | 20942                   | 79038<br>78978       | 00564             | 79620<br>79542          | 48         |
| 14         | 20458          | 99436<br>99434                                    | 211022                  | 78898                | 00566             | 79342<br>7 <b>94</b> 65 | 46         |
| 15         | 20535          | 99432   | 21102                   | 78818                | 00568             | 79387                   | 45         |
| 16         | 20691          | 99432<br>99429                                    | 21162                   | 78739                | 00571             | 79309                   | 45         |
| 17         | 20768          | 99427   | 21201<br>21 <b>3</b> 41 | 78659                | 00573             | 79232                   | 43         |
| 18         | 20845          | 99425   | 21420                   | 78580                | 00575             | 79232                   | 42         |
| 19         | 20922          | 99423   | 21420                   | 78501                | 00577             | 79078                   | 41         |
| 20         | 9 . 20999      | 9.99421   | 9.21578                 | 10.78422             | 10.00579          | 10.79001                | 40         |
| 21         | 21076          | 99419   | 21657                   | 78343                | 00581             | 78924                   | 39         |
| 22         | 21153          | 99417   | 21796                   | 78264                | 00583             | 78847                   | 38         |
| 23         | 21229          | 99415   | 21814                   | 78186                | <b>905</b> 85     | 78771                   | 37         |
| 24         | 21306          | 99413   | 21893                   | 78107                | 00587             | 78694                   | 96         |
| 25         | 21382          | 99411   | 21971                   | 78029                | 00589             | 78618                   | 85         |
| 26<br>27   | 21458          | 99409   | 22049                   | 77951                | 00591             | 78542                   | 94         |
| 27<br>28   | 21534          | 99407   | 22127                   | 77873                | 00593             | 78466                   | 83         |
| 28         | 21610          | 99404   | 22205                   | 77795                | 00596             | 78390                   | 32         |
|            | 21685          | 99402   | 22283                   | 77717                | 00598             | 78815                   | 31         |
| 30         | 9.21761        | 9.99400   | 9.22361                 | 10.77639             | 10.00600          | 10.78239                | 30         |
| 91         | 21836          | 99398   | 22438                   | 77562                | 00602             | 78164                   | 29         |
| 32<br>33   | 21912          | 99396   | 22516                   | 77484                | 00604             | 78088                   | 28         |
| 33         | 21987          | 99394   | 22593<br>99670          | 77407                | 00606             | 78013                   | 27         |
| 35         | 22062<br>99197 | 99392   | 22670<br>22747          | 77830<br>77959       | 00608             | 77938<br>77869          | 26         |
| 36         | 22137<br>22211 | 99390<br>99388                                    | 22747<br>22824          | 77253<br>77176       | 00610<br>00612    | 77 <b>8</b> 63<br>77789 | 25<br>24   |
| 37         | 22211          | 99388<br>9938 <i>5</i>                            | 22824<br>22901          | 77176                | 00612             | 77714                   | 29         |
| 38         | 22361          | 99383<br>99383                                    | 22977                   | 77099                | 00617             | 77639                   | 22         |
| 39         | 22361<br>22435 | 99383<br>99381                                    | 23054                   | 76946                | 00617             | 77565                   | 21         |
| 40         |                |   |                         |                      |                   |                         |            |
| 41         | 9 . 22509      | 9.99379   | 9.23130                 | 10.76870             | 10 . 00621        | 10.77491                | 20         |
| 42         | 22583          | 99877   | 23206                   | 76794                | 00623<br>00625    | 77417                   | 19         |
| 49         | 22657<br>22731 | 99375   | 23288<br>23359          | 76717                | 00625             | 77848<br>77269          | 18         |
| 44         | 22731<br>22805 | 99 <b>3</b> 72<br>99370                           | 25359<br>2543 <i>5</i>  | 76641<br>76565       | 00630             | 77269                   | 16         |
| 45         | 22805<br>22878 | 99370<br>99368                                    | 23435<br>23510          | 76565                | 00632             | 77195<br>77122          | 16         |
| 46         | 22878<br>22952 | 99368   | 23510                   | 76414                | 00632             | 77122                   | 14         |
| 47         | 23025          | 99364   | 23661                   | 76339                | 00634             | 76975                   | 13         |
| 48         | 23023          | 99362   | 23787                   | 76263                | 00638             | 76902                   | 19         |
| 49         | 23038          | 99859   | 23812                   | 76188                | 00641             | 76829                   | 11         |
| 50         | 9.23244        | 9.99357   | 9.23887                 | 10.76113             | 10.00648          | 10.76756                | 10         |
| 51         | 23817          | 99855   | 28962                   | 76038                | 00645             | 76683                   | 9          |
| 52         | 23390          | 99353   | 24037                   | 75963                | 00647             | 76610                   | 8          |
| <i>5</i> 3 | 23462          | 99851   | 24112                   | 7 <i>5</i> 888       | 00649             | 76538                   | 7          |
| .54        | 23535          | 99848   | 24186                   | 75814                | 00652             | 76465                   | 6          |
| 55         | 23607          | 99346   | 24261                   | 75789                | 00654             | 76393                   | 5          |
| 56         | 23679          | 99344   | 24335                   | 75665                | 00656             | <b>76</b> 321           | 4          |
| 57         | <b>23</b> 752  | 99842   | 24410                   | 71590                | 00658             | -76248                  | 3          |
| 58         | 23823          | 99840   | 24484                   | 75516                | 00660             | 76177                   | 2          |
| 59<br>60   | 23895<br>93067 | 99937   | · 24558                 | 75442<br>75368       | 00663<br>00665    | 76105<br>76033          | 0          |
| ===        | 23967          | 99365   | 24632                   |                      | ·                 |                         |            |
| Ħ          | Co-sine.       | Sine.   | Co-tangent.             | Tangent.             | Co-secant.        | Secant.                 | . M.       |

TABLE X1.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|                          |                    |                                  | 10 De              | grees.                   |                                       |  |          |
|--------------------------|--------------------|----------------------------------|--------------------|--------------------------|---------------------------------------|--|----------|
| M.                       | Sine.              | Co-sine.                         | Tangent.           | Co-tangent.              | Secant.                               | Co-secant.                               |          |
| 0                        | 9 . 23967          | 9 . 99335                        | 9 . 24632          | 10.75368                 | 10.00 <b>665</b>                      | 10.76033                                 | 60       |
| 1                        | 24039              | 99933                            | 24706              | 75294                    | 00667                                 | 75961                                    | 59       |
| 2                        | 24110              | 99331                            | 24779<br>24853     | 75221                    | 00669<br>00672                        | 75890<br>75819                           | 58<br>57 |
| 9<br>4                   | 24181<br>24253     | 99328.<br>99326                  | 24926              | 75147<br>75074           | 00674                                 | 75747                                    | 56       |
| 5                        | 24324              | 99324                            | 25000              | 75000                    | 00676                                 | 75676                                    | 55       |
| 6                        | 24395              | 99322                            | 25073              | 74927                    | 00678                                 | 75605                                    | 54       |
| 7                        | 24466              | 99319                            | 25146              | 74854                    | 00681                                 | 75534                                    | 53       |
| 8                        | 24536              | 99317                            | 25219              | 74781                    | 00683                                 | 75464                                    | 52       |
| 9.                       | 24607              | 99315                            | 25292              | 74708                    | 00685                                 | 75393                                    | 51       |
| 10                       | 9.24677            | 9.99313                          | 9 . 25365          | 10.74635                 | 10.00687                              | 10 . 75323                               | 50       |
| 11                       | 24748              | 99310                            | 25437              | 74563                    | 00690<br>00692                        | 7 <i>5</i> <b>2</b> 52<br>7 <b>5</b> 182 | 49<br>48 |
| 12<br>13                 | 24818<br>24888     | 99308<br>99306                   | 35510<br>25582     | 74490<br>74418           | 00692                                 | 75112                                    | 47       |
| 14                       | 24958              | 99304                            | 25655              | 74345                    | 00696                                 | 75042                                    | 46       |
| .15                      | 25028              | 99301                            | 25727              | 74273                    | 00699                                 | 74972                                    | 45       |
| 16                       | 25098              | 99299                            | 25799              | 74201                    | 00701                                 | 74902                                    | 44       |
| 17                       | 25168              | 99297                            | 25871              | 74129                    | 00703                                 | 74832                                    | 48       |
| 18                       | 25237              | 99294                            | 25943              | 74057                    | 00706                                 | 74763                                    | 42       |
| 19                       | 25307              | 99292                            | 26015              | 73985                    | 00708                                 | 74693                                    | 41       |
| 20                       | 9.25376            | 9 . 99290                        | 9 . 26086          | 10.73914                 | 10 . 00710                            | 10 . 74624                               | 40<br>39 |
| 21                       | 25445              | 99288<br>99285                   | 26158<br>26229     | 73842                    | 00712<br>00715                        | 74555<br>74486                           | 38       |
| 22<br>23                 | 25514<br>25583     | 99263                            | 26301              | 78771 .<br>78 <b>699</b> | 00717                                 | 74417                                    | 37       |
| 24                       | 23652              | 99281                            | 26372              | 73628                    | 00719                                 | 74348                                    | 36       |
| 25                       | 25721              | 99278                            | 26443              | 73557                    | 00722                                 | 74279                                    | 35       |
| 26                       | 25790              | 99276                            | 26514              | 73486                    | 00724                                 | 74210                                    | 34       |
| 27                       | 25858              | 99274                            | 26585              | 78415                    | 00726                                 | 74142                                    | 33       |
| 28                       | <b>25</b> 927      | 99271                            | 26655              | 78345                    | 00729                                 | 74073                                    | 32       |
| 29                       | 25995              | 99269                            | 26726              | 73274                    | 00731                                 | 74005                                    | 31       |
| 30                       | 9.26063.           | 9 . 99267                        | 9 . 26797          | 10 . 73203               | 10 . 00723                            | 10.79937                                 | 30<br>29 |
| <b>3</b> 1<br><b>3</b> 2 | 26131<br>26199     | 99264<br>99262                   | 26867<br>-26937    | 73133<br>73063           | 00736<br>00738                        | 73869<br>73801                           | 28       |
| 33                       | 26267              | 99260                            | 27008              | 72992                    | 00740                                 | 73733                                    | 27       |
| 34                       | 26335              | 99257                            | 27078              | 72922                    | 00743                                 | 73665                                    | 26       |
| 35                       | 26409              | 99255                            | 27148              | 72852                    | 00745                                 | 78597                                    | 25       |
| 36                       | 26470              | 99252                            | 27218              | 72782                    | 00748                                 | 73530                                    | 24       |
| 57                       | 2 <b>65</b> 38     | 99250                            | 27288              | 72712                    | 00750                                 | 73462                                    | 23       |
| 98                       | 26605              | 99248<br>99245                   | 27857<br>27427     | 72648                    | 00752                                 | 73395                                    | 22<br>21 |
| 39                       | 26672              |                                  |                    | 72573                    | 00755                                 | 73328                                    |          |
| 40                       | 9 · 26739<br>26806 | 9 . 99248<br>99241               | 9 . 27496<br>27566 | 10 . 72504<br>72484      | 10 . 007 <i>5</i> 7<br>007 <i>5</i> 9 | 10.78261<br>73194                        | 20<br>19 |
| 42                       | 2687 <b>3</b>      | 99238                            | 27635              | 72365                    | 00762                                 | 73127                                    | 18       |
| 48                       | 26940              | 99236                            | 27704              | 72296                    | 00764                                 | 79060                                    | 17       |
| 44                       | 27007              | 99238                            | 27773              | 72227                    | 00767                                 | 72993                                    | 16       |
| 45                       | 27073              | 99231                            | 27842              | 721 <i>5</i> 8           | 00769                                 | 72 <b>92</b> 7                           | 15       |
| 46                       | 27140              | . 99229                          | 27911              | 72089                    | 00771                                 | 72860                                    | 14       |
| 47<br>48                 | 27206<br>27273     | 9 <b>92</b> 26<br>9 <b>92</b> 24 | 27980<br>28049     | 72020                    | 00774                                 | 72794                                    | 13       |
| 49                       | 27273<br>27339     | 99224                            | 28049<br>28117     | 71951<br>71883           | 00776<br>00779                        | 72727<br>72661                           | ii       |
| 50                       | 9 . 27405          | 9.99219                          | 9.28186            | 10.71814                 | 10.00781                              | 10.72595                                 | 10       |
| 51                       | 27471              | 99217                            | 28254              | 71746                    | 00783                                 | 72529                                    | 9        |
| 52                       | 27537              | 99214                            | 28323              | 71677                    | 00786                                 | 72463                                    | -8       |
| 53                       | 27602              | 99212                            | <b>28</b> 391      | 71609                    | 00788                                 | 72898                                    | 7        |
| 54                       | 27668              | 99209                            | 28459              | 71541                    | 00791                                 | 72532                                    | 6        |
| 55                       | 27734              | 99207                            | 28527              | 71478                    | 00793                                 | 72266                                    | 5 4      |
| 56<br>57                 | 27799<br>27864     | 99204<br>9 <b>9202</b>           | 28595<br>28662     | 71405                    | 00796                                 | 72201                                    | 3        |
| <b>5</b> 8               | 27930              | 99200                            | 28730              | <b>71338</b><br>71270    | 00798<br>00800                        | <b>72</b> 136<br><b>720</b> 70           | 2        |
| 59                       | 27995              | 99197                            | 28798              | 71202                    | 00803                                 | 72005                                    | ī        |
| 60                       | 28060              | 99195                            | 28865              | 71135                    | 00805                                 | 71940                                    | 0        |
|                          | Co-sine.           | , Sine.                          | Co-tangent.        | Tangent.                 | Co-secant.                            | Secant.                                  | M.       |
|                          |                    |                                  |                    |                          | · · · · · · · · · · · · · · · · · · · |  | •        |

# TABLE XI. LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|     | 1             |           | 11 De          | grees                  |               | <del></del>     | 1   |
|-----|---------------|-----------|----------------|------------------------|---------------|-----------------|-----|
| M.  | Sine.         | Co-sine.  | Tangent.       | Co-tangent.            | Secant.       | Co-secant.      |     |
| 0   | 9.28060       | 9.99195   | 9.28865        | 10.71195               | 10.00805      | 10.71940        | 60  |
| 1   | 28125         | 99192     | 28933          | 71067                  | 00808         | 71875           | 59  |
| 2   | 28190         | 99190     | 29000          | 71000                  | 00810         | 71810           | 58  |
| S   | 28254         | 99187     | 29067          | 70983                  | 00813         | .717 <b>4</b> 6 | 57  |
| ł 4 | 28319         | 99185     | 29134          | 70866                  | 00815         | 71681           | 56  |
| 5   | 28384         | 99182     | 29201          | 70799                  | 00818         | 71616           | 55  |
| 6   | 28448         | 99180     | 29268          | 70732                  | 00820         | 71552           | 54  |
| 7   | 28512         | 99177     | 29335          | 70665                  | 00823         | 71488           | 53  |
| 8   | 28577         | 99175     | 29402          |                        | 00825         | 71423           | 52  |
| 9.  | 28641         | 99172     | 29468          | 70598<br>70532         | 00828         | 71859           | 51  |
| 10  | 9 . 28705     | 9 . 99170 | 9.29535        | 10.70465               | 10.00830      | 10 . 71295      | 50  |
| 11  | 28769         | 99167     | 29601          | 70399                  | 00833         | 71231           | 49  |
| 12  | 28833         | 99165     | 29668          | 70332                  | 00835         | 71167           | 48  |
| 13  | 28896         | 99162     | 29784          | 70266                  | 00838         | 71104           | 47  |
| 14  | 28960         | 99160     | 29800          | 70200                  | 00840         | 71040           | 46  |
| 15  | 29024         | 99157     | 29866          | 70134                  | 00843         | 70976           | 45  |
| 16  | 29087         | 99165     | 29932          | 70068                  | 00845         | 70913           | 44  |
| 17  | 29150         | 99152     | 29998          | 70002                  | 00848         | 70850           | 43  |
| 18  |               |           |                |                        | 00850         |                 | 42  |
| 19  | 29214         | 99150     | 30064          | 69 <b>9</b> 36         |               | 70786           | 41  |
|     | 29277         | 99147     | 30190          | 69870                  | 00853         | 70723           |     |
| 20  | 9.29340       | 9 . 99145 | 9.90195        | 10.69805               | 10.00855      | 10.70660        | 40  |
|     | 29403         | 99142     | 30261          | 69789                  | 00858         | 70597           | 39  |
| 22  | 29466         | 99140     | 30326          | 69674                  | 00860         | 70594           | 38  |
| 23  | 29529         | 99137     | 30391          | <b>69</b> 609          | 00863         | 70471           | 37  |
| 24  | 29591         | 99185     | 30457          | <b>6954</b> 3          | 00865         | 70409           | ,36 |
| 25  | 29654         | 99132     | 30522          | <b>694</b> 78          | 00868         | 703 <b>4</b> 6  | 35  |
| 26  | 29716         | 99150     | -30587         | 69413                  | 00870         | 70284           | 34  |
| 27  | 29779         | 99127     | 30652          | 69348                  | 00873         | 70221           | 33  |
| 28  | 29841         | 99124     | 30717          | 69283                  | <b>0</b> 0876 | 70159           | 32  |
| 29  | 29903         | 99122     | 50782          | 69218                  | 00878         | 70097           | 31  |
| 30  | 9.29966       | 9.99119   | 9.30846        | 10 . 69154             | 10.00881      | 10.70034        | 30  |
| 31  | 90028         | 99117     | 80911          | 69089                  | 00883         | 69972           | 29  |
| 32  | 30090         | 99114     | 80975          | 69025                  | 00886         | 69910           | 28  |
| 33  | 30151         | 99112     | \$1040         | 68960                  | 00888         | 69849           | 27  |
| 94  | 30213         | 99109     | 31104          | 68896                  | 00891         | 69787           | 26  |
| 35  | 30275         | 99106     | 91168          | 68832                  | 00894         | 69725           | 25  |
| 36  | 30836         | 99104     | 31233          | 68767                  | 00896         | 69664           | 24  |
| 37  | 50398         | 99101     | 31297          | 68703                  | 00899         | 69602           | 23  |
| 38  | 30459         | 99099     | 31961          | 68639                  | 90901         | 69541           | 22  |
| 39  | 30521         | 99096     | 31425          | 68 <i>5</i> 7 <i>5</i> | . 00904       | 69479           | 21  |
| 40  | 9.30582       | 9.99093   | 9.31489        | 10.68511               | 10.00907      | 10.69418        | 20  |
| 41  | 90643         | 99091     | 31582          | 68448                  | 00909         | 69957           | 19  |
| 42  | 30704         | 99088     | 31616          | 68384                  | 00909         | 69296           | 18  |
| 43  |               | 99086     |                |                        | 00912         | 69235           | 17  |
| 44  | <b>307</b> 65 |           | 31679          | 68821                  |               | 69174           | 16  |
|     | 30826         | 99088     | 31743          | 68257                  | 00917         |                 | 15  |
| 45  | 30887         | 99080     | 91806          | 68194                  | 00920         | 69113           |     |
| 46  | 90947         | 99078     | 31870          | 68130                  | 00922         | 69053           | 14  |
| 47  | 31008         | 99075     | 31983          | 68067                  | 00925         | 68992           | 13  |
| 48  | 81068         | 99072     | 31996          | 68004                  | 00928         | 68962           | 12  |
| 49  | , 31129       | 99070     | 32059          | 67941                  | 00930         | 68871           | 11  |
| 50  | 9.31189       | 9 - 99067 | 9.32122        | 10.67878               | 10.00933      | 10.68811        | 10  |
| 51  | <b>3125</b> 0 | 99064     | 32185          | 67815                  | 00936         | 68750           | 9   |
| 52  | 31910         | 99062     | 32248          | 67752                  | 00938         | 68690           | 8   |
| 53  | 31370         | 99059     | 92311          | 67689                  | 00941         | 68630           | 7   |
| 54  | 81430         | 99056     | 32373          | 67627                  | 00944         | 68570           | 6.  |
| 55  | 31490         | 99054     | 82436          | 67564                  | 00946         | 68510           | 5   |
| 56  | 31549         | 99051     | 32498          | 67502                  | 00949         | 68451           | 4   |
| 57  | 31609         | 99048     | 32561          | 67439                  | 00952         | 68391           | 8   |
| 58  | 31669         | 99046     | <b>32623</b>   | 67377                  | 00954         | 68331           | 2   |
| 59  | 31728         | 99043     | 3268 <i>5</i>  | 67515                  | 00957         | 68272           | l ī |
| 60  | 31788         | 99040     | 32003<br>32747 | 67253                  | 00960         | 68212           | ō   |
| _   | Co-sine.      | Sine.     |                |                        | Co-secant.    | Secant.         | M.  |
| 1   | Co-dille.     | , sine.   | Co-tangent.    | Tangent.               | · CO-OCCUILL  | ,               | 1   |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|            |                                |                  | 12 De                          | grees.                         | <del></del>       |                                    |          |
|------------|--------------------------------|------------------|--------------------------------|--------------------------------|-------------------|------------------------------------|----------|
| M.         | Sine.                          | Co-sine.         | Tangent.                       | Co-tangent.                    | Secant.           | Co-secant.                         |          |
| 0          | 9.31788                        | 9.99040          | 9.32747                        | 10.67253                       | 10.00960          | 10.68212                           | 60       |
| 1          | 31847                          | ·99038           | S2810                          | 67190                          | 00962             | 681 <i>5</i> 3                     | 59       |
| 8          | 31907                          | 99035            | 82872                          | 67128                          | 00965             | 68093                              | 58       |
| 8          | 31966                          | 99032            | 32933                          | 67067                          | 00968             | 68034                              | 57       |
| 4          | <b>32</b> 025                  | 99030            | <b>329</b> 95                  | 67005                          | 00970             | 67975                              | 56       |
| 5          | 32084                          | 99027            | 33057                          | 66943                          | 00973             | 67916                              | 55       |
| 6          | 32143                          | 99024            | 33119                          | 66881                          | 00976             | 67857                              | 54       |
| 7          | <b>32202</b>                   | 99022            | 33180                          | 66820                          | 00978             | 67798                              | 53<br>52 |
| 8          | · 32261<br>32319               | 99019<br>99016   | 33242<br>. 33303               | 66758<br>66697                 | 00981<br>00984    | 67739<br>67 <b>6</b> 81            | - 51     |
|            |                                |                  |                                |                                |                   |                                    |          |
| 10         | 9.32378                        | 9:99013          | 9.33365                        | 10.66635                       | 10.00987<br>00989 | 10 <b>. 67622</b><br><b>6756</b> 3 | 50<br>49 |
| 12         | <b>324</b> 37                  | 99011<br>99008   | 33426<br>33487                 | 66574<br><b>665</b> 13         | . 00992           | 67 <i>5</i> 0 <i>5</i>             | 48       |
| 13         | <b>9249</b> 5<br><b>925</b> 53 | 99005            | 33548                          | 66452                          | 00995             | 67447                              | 47       |
| 14         | 32612                          | 99002            | 33609                          | 66391                          | 00998             | <b>675</b> 68                      | 46       |
| 15         | 32670                          | 99000            | 33670                          | 66350                          | 01000             | 67330                              | 45       |
| 16         | <b>32</b> 728                  | 98997            | 53731                          | 66269                          | 01003             | 67272                              | 44       |
| 17         | 32786                          | 98994            | 33792                          | 66208                          | 01006             | 67214                              | 43       |
| 18         | 82844                          | 98991            | <b>3</b> 38 <i>5</i> 3         | 66147                          | 01009             | 67156                              | 48       |
| 19         | 32902                          | 98989            | 33913                          | 66087                          | 01011             | 67098                              | 41       |
|            |                                |                  | 9.33974                        |                                |                   | 10.67040                           | 40       |
| 20<br>21   | 9.32960<br>39018               | 9.98986<br>98983 | 9.33974<br>34084               | 10 . 66026<br>65966            | 01014             | 66982                              | 39       |
| 21         | 33018<br>33075                 | 98980            | 34095                          | 65905                          | 01020             | 66925                              | 38       |
| 23         | <b>33</b> 073<br><b>33</b> 153 | 98978            | 34155                          | 65845                          | 01020             | 66867                              | 37       |
| 24         | <b>33</b> 133                  | 9897 <i>5</i>    | <b>342</b> 15                  | 6 <b>5</b> 78 <b>5</b>         | 01025             | 66810                              | 36       |
| 25         | 33248                          | 98972            | <b>342</b> 76                  | 65724                          | 01028             | 66752                              | 35       |
| 26         | 33305                          | 98969            | 34396                          | 65664                          | 01031             | 66695                              | 34       |
| 27         | 53362                          | 98967            | 34396                          | 65604                          | 01033             | 66638                              | 33       |
| 28         | 33420                          | 98964            | 34456                          | 65544                          | 01036             | 66580                              | 82       |
| 29         | <b>53477</b>                   | 98961            | 34516                          | 65484                          | 01039             | <b>665</b> 23                      | 31       |
| 30         | 9 . 33534                      | 9.98958          | 9.34576                        | 10.65424                       | 10.01042          | 10.66466                           | 50       |
| 31         | 33591                          | 98955            | <b>346</b> 35                  | <b>65365</b>                   | 01045             | 66409                              | 29       |
| 32         | 33647                          | 98953            | <b>3469</b> 5                  | <b>653</b> 05                  | 01047             | 66353                              | 28       |
| 33         | 33704                          | 989 <i>5</i> 0   | <b>34</b> 7 <i>55</i>          | 65245                          | 01050             | 66296                              | 27       |
| 34         | ′33761                         | 98947            | 94814 •                        | 65186                          | 01053             | 66239                              | 26       |
| 35         | 39818                          | 98944            | 34874                          | 65126                          | 01056             | 66182                              | 25       |
| 36         | 99874                          | 98941            | 34935                          | 65067                          | 01059             | 66126                              | 24       |
| 37         | 33931                          | 98938            | 34992                          | 65008                          | 01062             | 66069                              | 23       |
| 38<br>39   | <b>33987</b><br><b>3404</b> 3  | 98936<br>98933   | <b>350</b> 51<br><b>351</b> 11 | 64949<br>64889                 | 01064<br>01067    | 66013<br>65957                     | 22<br>21 |
| 40         | 9.34100                        | 9.98930          | 9.35170                        | 10.64830                       | 10.01070          | 10.65900                           | 20       |
| 41         | 34156                          | 98927            | 35229                          | 64771                          | 01073             | 65844                              | 19       |
| 42         | <b>842</b> 12                  | 98924            | 35288                          | 64712                          | 01076             | 65788                              | 18       |
| 43         | 34268                          | 98921            | 35347                          | 64653                          | 01079             | 65732                              | 17       |
| 44         | 34924                          | 98919            | 35405                          | 64595                          | 01081             | 65676                              | 16       |
| 45         | 34380                          | 98916            | <b>354</b> 64                  | 64536                          | 01084             | 65620                              | ₹5       |
| 46         | <b>344</b> 36                  | 98913            | <b>8552</b> 3                  | 64474                          | 01087             | 65564                              | 14       |
| 47         | <b>844</b> 91                  | 98910            | 35 <b>5</b> 81                 | 64419                          | 01090             | <b>655</b> 09                      | 13       |
| 48         | <b>84</b> 547                  | 98907            | 35640                          | 64860                          | 01093             | 65453                              | 12       |
| 49         | 34602                          | 98904            | <b>356</b> 98                  | 64302                          | 01096             | 65398                              | 11       |
| 50         | 9.34658                        | 9.98901          | 9.85757                        | 10.64243                       | 10.01099          | 10.65942                           | 10       |
| 51         | <b>347</b> 13                  | 98898            | 35815                          | 64185                          | 01102             | 65287                              | 9        |
| 52         | 34769                          | 98896            | <b>95</b> 873                  | 64127                          | 01104             | 65231                              | 8        |
| <i>5</i> 3 | 34824                          | 98893            | . <b>359</b> 31                | 64069                          | 01107             | 65176                              | 7        |
| 54         | 94879                          | 98890            | 3 <b>59</b> 89                 | 64011                          | 01110             | 65121                              | 6        |
| 55<br>*C   | \$4934                         | 98887            | 36047                          | <b>639</b> 53                  | 01113             | 65066                              | 5        |
| <i>5</i> 6 | 34989                          | 98884            | 36105<br>96169                 | 63895                          | 01116             | 65011                              | 3        |
| 57<br>58   | 35044                          | 98881<br>98878   | <b>361</b> 63<br><b>362</b> 21 | 63837                          | 01119             | 64956                              | 3        |
| 59         | 35099<br>35154                 | 98875            | 36279                          | <b>637</b> 79<br><b>637</b> 21 | 01122             | 64901<br>64846                     | i        |
| 60         | 85209                          | 98872            | <b>363</b> 36                  | 63664                          | 01123             | 64791                              | ò        |
|            | Co-sine.                       | Sine.            | Co-tangent.                    | Tangent.                       | Co-secant.        | Secant.                            | M.       |
|            | J Co-unici                     |                  | ·                              | grees.                         | 1 ~ contraints    | 1                                  |          |
|            |                                |                  |                                |                                | 2                 |                                    |          |

|            | LOGARITHMIC SINES, TANGENTS, AND SECANTS. |                        |                                     |                            |                 |                                 |          |  |  |  |
|------------|---|------------------------|-------------------------------------|----------------------------|-----------------|---------------------------------|----------|--|--|--|
|            |   | <del></del>            | 13 De                               | ~                          |                 |                                 |          |  |  |  |
| M.         | Sine.                                     | Co-sine.               | Tangent,                            | Co-tangent.                | Secant.         | Co-secant.                      |          |  |  |  |
| 0          | 9.35209                                   | 9.98872                | 9.36356                             | 10.63664                   | 10.01128        | 10.64791                        | 60       |  |  |  |
| 1          | 35263                                     | 98869                  | 36394                               | 63606                      | 01151           | <b>64</b> 79 <b>7</b>           | 59       |  |  |  |
| 2          | 95318                                     | 98867                  | 36452                               | 63548                      | 01188           | 64682                           | 58       |  |  |  |
| 8          | 35979                                     | 98864                  | 36509                               | 69491                      | 01136           | 64627                           | 57<br>56 |  |  |  |
| 4<br>5     | 35427<br>35481                            | 98861<br>98858         | 36566<br>36624                      | <b>63434</b><br>63376      | 01139<br>01142  | 64573<br>64519                  | 55<br>55 |  |  |  |
| 6          | 35536                                     | 988 <i>55</i>          | 36681                               | 63319                      | 01145           | 64464                           | 54       |  |  |  |
| 7          | 35 <b>5</b> 90                            | 98852                  | 36738                               | 63262                      | 01148           | 64410                           | 53       |  |  |  |
| 8          | 35644                                     | 98849                  | 36795                               | 63205                      | 01151           | 64356                           | 52       |  |  |  |
| 9          | <b>956</b> 98                             | 98846                  | 36852                               | 63148                      | 01154           | 54302                           | 51       |  |  |  |
| 10         | 9.35752                                   | 9.98843                | 9.36909                             | 10.63091                   | 10.01157        | 10 . 64248                      | 50       |  |  |  |
| 11         | <b>858</b> 06                             | 98840                  | <b>369</b> 66                       | 63034                      | 01160           | 64194                           | 49       |  |  |  |
| 12         | 35860                                     | 98837                  | 37023                               | 62977                      | 01163           | 64140                           | 48       |  |  |  |
| 13         | <b>35</b> 914                             | 98884                  | 87080                               | 63920                      | 01166           | 64086                           | 47       |  |  |  |
| 14         | 35968                                     | 98831                  | 97137                               | 62863                      | 01169           | 64032                           | 46       |  |  |  |
| 15         | 36022                                     | 98828                  | 37193                               | 62807                      | 01172           | 63978                           | 45       |  |  |  |
| 16         | <b>360</b> 75                             | 98825                  | 37250                               | 62750                      | 01175           | 63925                           | 44       |  |  |  |
| 17<br>18   | 36129<br>36182                            | 98822<br>98819         | 37306<br>37363                      | 6269 <del>4</del><br>62637 | 01178<br>01·181 | 63871<br>63818                  | 49<br>42 |  |  |  |
| 19         | 36286                                     | 98816                  | 37419                               | 62581                      | 01184           | 63764                           | 41       |  |  |  |
|            | <u></u>                                   |                        |                                     |                            |                 |                                 |          |  |  |  |
| 20         | 9.36289                                   | 9.98813                | 9.37476                             | 10.62524                   | 10.01187        | 10.63711                        | 40       |  |  |  |
| 21         | 36342                                     | 96810                  | 87532                               | 62468                      | 01190           | 63658                           | 39<br>38 |  |  |  |
| 22<br>23   | 36395<br>36449                            | 98807<br>98804         | 37 <i>5</i> 88<br>376 <del>44</del> | 62412<br>62356             | 01193<br>01196  | 63605<br>63551                  | 37       |  |  |  |
| 24         | 36502                                     | 98801                  | 87700                               | 62300                      | 01199           | 63498                           | 36       |  |  |  |
| 25         | <b>365</b> 55                             | 98798                  | 37756                               | 62244                      | 01202           | 63445                           | 35       |  |  |  |
| 26         | 36607                                     | 98795                  | 37812                               | 62188                      | 01205           | 63392                           | 34       |  |  |  |
| 27         | 36660                                     | 98792                  | 37868                               | 62132                      | 01208           | 69340                           | 38       |  |  |  |
| 28         | 36713                                     | 98789                  | 37924                               | 62076                      | 01211           | 63287                           | 32.      |  |  |  |
| 29         | 86766                                     | 98786                  | 3 <b>798</b> 0                      | 62020                      | 01214           | 63234                           | 31       |  |  |  |
| 30         | 9.36819                                   | 9.98783                | 9.38035                             | 10.61965                   | 10.01217        | 10.63181                        | 30       |  |  |  |
| 81         | 36871                                     | 98780                  | 38091                               | 61909                      | 01220           | 63129                           | 29       |  |  |  |
| - 32       | 36924                                     | 98777                  | 38147                               | 61853                      | 01223           | 63076                           | 28       |  |  |  |
| 33         | <b>369</b> 76                             | 98774                  | 38202                               | 61798                      | 01-226          | 63024                           | 27       |  |  |  |
| 34<br>35   | 37028<br>37081                            | 98771                  | 38257<br>38313                      | 61743                      | 01229<br>01232  | 62972                           | 26<br>25 |  |  |  |
| 36         | 97199                                     | 98768<br>98765         | 38368                               | 61687<br>61632             | 01232           | 62919<br>62867                  | 24       |  |  |  |
| 37         | 37185                                     | 98762                  | 38423                               | 61577                      | 01238           | 62815                           | 23       |  |  |  |
| 38         | 37237                                     | 98759                  | 38479                               | 61521                      | 01241           | 62763                           | 22       |  |  |  |
| 39         | 37289                                     | 98756                  | <b>385</b> 34                       | 61466                      | 01244           | 62711                           | 21       |  |  |  |
| - 40       | 9.37941                                   | 9.98753                | 9.38589                             | 10.61411                   | 1001247         | 10 . 62659                      | 20       |  |  |  |
| 41         | 37393                                     | 987 <i>5</i> 0         | 38644                               | 61356                      | 01250           | 62607                           | 19       |  |  |  |
| 42         | 37445                                     | 98746                  | 38699                               | 61301                      | 01254           | 62555                           | 18       |  |  |  |
| 43         | <b>374</b> 97.                            | 98749                  | 38754                               | 61246                      | 01257           | 62503                           | 17       |  |  |  |
| 44         | 475-19                                    | 98740                  | 38803                               | 61192                      | 01260           | 62451                           | 16       |  |  |  |
| 45         | 37600                                     | 98787                  | 38863                               | 61137                      | 01263           | 62400                           | 15       |  |  |  |
| 46<br>47   | 37652<br>97703                            | 98734<br>98731         | 38918<br>38972                      | 61082                      | 01266<br>01269  | 62348<br>62296                  | 14<br>13 |  |  |  |
| 48         | 37703<br>377 <i>55</i>                    | 98728                  | 39027                               | 61028<br>60973             | 01269           | 62245                           | 12       |  |  |  |
| 49         | 37806                                     | > 98725                | 39082                               | 60918                      | 01275           | 62194                           | ii       |  |  |  |
| -          |   | <del></del>            |                                     |                            |                 |                                 |          |  |  |  |
| 50<br>51   | 9.37858                                   | 9.98722                | 9.39136                             | 10.60864                   | 10.01278        | 10.62142                        | 10<br>9  |  |  |  |
| 51<br>52   | 37909<br>37960                            | 98719<br>9871 <i>5</i> | 39190<br>39245                      | 60810<br>60755             | 01281<br>01285  | 62091<br>62040                  | 8        |  |  |  |
| 58         | 38011                                     | 98712                  | 39299                               | 60701                      | 01288           | 61989                           | 7        |  |  |  |
| 54         | 38062                                     | 98709                  | 39353                               | 60647                      | 01291           | 61938                           | 6        |  |  |  |
| 5 <b>5</b> | <b>S8113</b>                              | 98706                  | 39407                               | 60593                      | 01994           | 61887                           | 5        |  |  |  |
| 56         | 98164                                     | 98703                  | 39461                               | <b>6</b> 0 <b>5</b> 39     | 01297           | 61836                           | 4        |  |  |  |
| 57         | 30215                                     | 98700                  | 39515                               | 60485                      | 01300           | 61785                           | 3        |  |  |  |
| 56<br>59   | 39266<br>99817                            | 98697                  | 39569                               | 60431                      | 01903           | 61734                           | 2        |  |  |  |
| 60         | 38317<br>38368                            | 98694<br>98690         | 39623<br>39677                      | 60377<br>60323             | 01306<br>01310  | 61 <b>683</b><br>61 <b>6</b> 32 | 0.       |  |  |  |
| ļ —        |   |                        |                                     |                            |                 |                                 |          |  |  |  |
|            | Co-sine.                                  | Sine.                  | Co-tangent.                         | Tangent.                   | Co-secant.      | Secant.                         | М.       |  |  |  |
|            | 1   |                        | 76 De                               | ~**                        |                 | _                               | 1        |  |  |  |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

| Sine.   Co-sine.   Tangent.   Co-tangent.   Secant.   Co-texast  |    |           |           | 14 De       | grees.          |             |            |      |
|--|----|-----------|-----------|-------------|-----------------|-------------|------------|------|
| 1 98418 98687 39786 60215 01316 61581 8 8 8 8469 98684 9786 60152 01319 61481 57 8 8570 98678 98828 60162 01319 61481 57 8 98670 98677 39899 60001 01325 61380 55 98680 98677 39899 60001 01325 61380 55 98670 98677 39899 60001 01329 61380 55 98821 98666 40052 59948 01332 61279 55 98821 98666 40052 59948 01332 61279 55 98821 98666 40052 59948 01332 61279 55 98821 98666 40052 59948 01332 61279 55 98821 98666 40052 59948 01332 61279 55 9841 01388 61179 51 98666 40052 59948 01332 61279 55 9841 01388 61179 51 98666 40052 59948 01332 61279 55 9841 01388 61179 51 98666 40052 59841 01388 61179 51 98666 40052 59841 01388 61179 51 98666 40052 59841 01388 61179 51 98666 40052 59841 01388 61179 51 98666 40052 59841 01388 61179 51 98666 40052 59861 01348 61079 48 98671 98666 40052 59568 01351 60079 47 98666 40052 59568 01351 60079 47 98666 40052 59568 01351 60079 47 98666 40052 59568 01360 60079 47 98666 40052 59568 01360 60079 47 98666 40052 59568 01360 60079 47 98660 40058 59568 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60080 44 90086 59511 01360 60083 37 90086 99860 41005 58995 01390 60083 37 90080 41005 58995 01390 60083 37 90080 41005 58995 01390 60083 37 90080 41005 58995 01390 60083 37 90080 41005 58995 01390 60083 37 90080 41005 58995 01390 60083 37 90080 41005 58995 01390 60083 37 90080 41005 58995 01390 60083 37 90080 41005 58995 01390 60083 37 90080 41005 58995 01390 60083 37 90080 41005 58995 01390 60083 37 90080 41080 58891 01396 60083 37 90080 41080 60080 41080 60080 41080 600 | M. | Sine.     | Co-sine.  |             |                 | Secant.     | Co-secant. |      |
| 1  | 0  | 9.38368   | 9,98690   | 9.39677     | 10 . 60323      | 10.01310    | 10.61632   | 60   |
| 2         38469         396841         39785         60215         01316         61.81         8           3         38519         39881         39882         60102         01319         61.80         5           5         38690         98675         39894         60005         01325         61.80         5           6         38670         39671         39899         60001         01325         61.80         5           7         38721         98668         40059         59948         01332         61.39         5           8         38771         98662         40105         59894         01335         61229         3           10         9.38871         98662         40266         59734         01344         61079         49           11         38921         98659         40265         59734         01344         61079         49           12         38971         98652         40319         59681         01344         61079         47           13         39021         98643         40473         59522         01357         60879         47           15         39121         98643  |    |           |           |             |                 |             | 61582      | 59   |
| \$\begin{array}{c} \text{38519} & \text{98678} & \text{38826} & \text{60108} & \text{601392} & \text{61480} & \text{5} & \text{38620} & \text{98675} & \text{39945} & \text{60055} & \text{61380} & \text{5} & \text{61299} &       | 2  |           |           | 39785       | 60215           | 01316       | 61581      | 58   |
| 4         98570         98678         99842         60108         01322         61480         5           6         98670         98671         39999         60001         01329         61300         5           7         38721         98668         40069         59948         01335         61390         5           8         38771         98662         40169         59841         01335         61293         2           10         9.38871         98652         40169         59841         01334         61799         2           11         38921         98652         40266         59784         10.01341         10.61079         9           12         38871         98652         40266         59784         10.344         61079         9           13         39021         98632         40319         59681         01341         61079         9           14         39071         98646         40425         59.575         01344         61029         4           15         39120         98636         40581         59469         01360         60780         4           16         39170         98636   |    |           |           |             |                 |             |            | 57   |
| 5         38690         98675         39945         60055         01325         61380         15           7         38701         98668         40059         59948         01332         61279         15           8         38711         98665         40106         59894         01332         61279         15           9         98821         98662         40169         59841         01332         61279         15           10         9.38871         9.08656         40166         59784         01344         10.61129         9           11         38921         9.8655         40966         59734         01344         61029         4           12         38971         98646         40372         59698         01351         6029         4           15         39121         98640         40531         59459         01364         60329         4           16         39170         98630         40584         59416         01364         60780         4           18         39270         98630         40584         59416         01364         60780         4           20         9.39369         9.8627   |    |           |           |             |                 |             |            |      |
| 6         S86701         99671         39999         60001         01329         61330         54           8         38771         98668         40069         59948         01332         61279         55           8         38771         98662         40169         59841         01335         61299         32           10         9.38871         9.98659         40261         0.59788         10.01341         10.61179         9           11         38921         98652         40266         59784         10.344         61079         49           12         38971         98652         40319         59681         0.1344         61079         48           13         39021         98640         40372         59628         01351         6079         47           15         39121         98640         40531         59459         01360         60890         46           16         39170         98630         40581         59469         01360         60890         4           18         39270         98633         40636         59361         01377         60681         41           21         39487         9  |    |           |           |             |                 |             |            |      |
| The color of the   |    |           |           |             | . 1             |             |            |      |
| 8         38771         98662         40166         59844         01385         61299         3           10         9.38871         9.98659         9.40212         10.59788         10.01341         10.61199         9           11         38921         98656         40266         59784         10.344         10.6179         9           12         38971         98652         40319         59681         0.1344         61079         9           13         39021         98646         40319         59681         0.1341         60079         47           14         39071         98646         40425         58:77         01344         60079         47           15         9121         98643         40478         59222         013.7         60899         47           16         39170         98636         40584         59416         01360         60880         48           17         39220         98636         40584         59364         01367         60790         42           19         39319         98650         40689         59311         01370         60681         44           22         39467   |    |           |           |             |                 |             |            |      |
| 9  |    |           |           |             |                 |             |            |      |
| 11   |    |           |           | 401 50      |                 |             |            |      |
| 11   | 10 | 9.38871   | 9 98659   | 9.40212     | 10.59788        | 10.01341    | 10.61129   | 50   |
| 12   |    |           |           | 40266       |                 | 01344       | 61079      | 49   |
| 13   39021   98649   40372   59628   01351   60979   4     15   39121   98643   40478   59529   01357   60879   4     16   39170   98640   40531   59469   01360   60830   4     17   59220   98633   40686   69364   60780   4     18   39270   98633   40686   69364   60780   4     19   39319   98630   40689   59311   01370   60681   4     20   9. 39369   9. 98627   9. 40742   10. 59258   10. 01373   60681   4     21   39418   98623   40795   59905   01377   60582   3     22   39467   98630   40847   59158   01380   60583   3     23   39517   98617   40900   59100   01383   60483   3     24   39566   98614   40952   59048   01386   60583   3     25   39615   98610   41005   58995   01390   60385   5     26   39664   98607   41007   58943   01396   60343   5     27   59713   98604   41109   58891   01396   60287   3     28   39762   98601   41161   58899   01390   60287   3     28   39762   98601   41161   58899   01390   60288   3     29   39811   98597   41214   58786   01403   60189   3     30   9. 39860   9. 98594   9. 41266   10. 58734   10. 01406   10. 60140   30     31   39909   98591   41318   58682   01409   60091   2     32   39968   98588   41370   58630   01412   60042   2     33   40006   98584   41422   58578   01416   59994   7     34   40055   98581   41318   58682   01409   60091   2     35   40103   98578   41526   58474   01422   59897   2     36   40152   98574   41578   58474   01442   59966   1     37   40900   98571   41629   58371   01432   59800   2     38   40249   98568   41681   58319   01495   59945   7     40   9. 40346   9. 98561   41939   58061   01449   59510   1     40   40   40682   98555   41887   58113   01445   59568   1     41   40394   98558   41836   58164   01442   59966   1     41   40394   98558   41836   58164   01442   59966   1     41   40394   98558   41836   58164   01449   59558   1     40   40   40682   98551   41939   57601   01449   59510   1     50   9. 40825   9. 98588   9. 42297   10. 57703   10. 01472   59967   1     50   9. 40825   9. 98588   9. 42297   10.   |    |           |           | 40319       |                 |             | 61029      | 48   |
| 14         39071         98646         40425         59.575         01354         60329         45           16         39170         98640         40531         59469         01360         6080         44           17         39220         98686         40584         59469         01360         6080         44           18         39270         98636         40689         59311         01370         60780         42           19         39369         9.8627         9.40742         10.5928         10.01373         10.60631         41           20         9.39467         98630         40745         59955         10377         60582         39           22         39467         98630         40847         59153         01380         60583         39           23         39517         39617         40900         59100         01383         60483         37           24         39566         98614         40952         59048         01886         60434         36           25         39615         98610         41005         58995         01390         60385         31           26         39664 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>60979</td><td>47</td></t<>  |    |           |           |             |                 |             | 60979      | 47   |
| 15   |    |           |           |             |                 |             | 60929      | 46   |
| 16   |    |           |           |             |                 |             |            | 45   |
| 17   39920   98696   40684   59416   01364   60780   48   39270   98693   40696   59364   01367   60780   42   60780   4   |    |           |           |             |                 |             |            | 44   |
| 18   39270   98633   40636   59364   01367   60790   42   42   42   42   40442   98555   41836   58311   01370   60631   42   42   40442   98555   41836   5811   01370   60631   42   43   40364   44   40364   44   40364   98551   41939   57601   419   40768   98521   42246   57754   01485   59926   10.01373   10.60631   41   40368   98511   40952   59045   01380   60583   38   40586   41057   58995   01390   60883   51   50801   41057   58995   01390   60883   51   50801   41057   58943   01396   60287   53   53   53   53   53   53   53   5   |    |           |           |             |                 |             |            | 43   |
| 19   39319   98630   40689   59311   01370   60681   41  |    |           |           |             |                 |             |            |      |
| 21         39418         98623         40795         £9205         01377         60382         38           22         39467         98620         40847         59153         01380         60383         38           24         39566         98614         40952         59048         01886         60434         36           25         39615         98610         41005         58995         01390         60385         35           26         39664         98607         41057         58943         01393         60385         35           27         39713         98604         41109         58891         01396         60287         32           28         39762         98601         41161         58893         01399         60238         32           29         39811         98597         41214         58786         01409         60238         32           31         39909         98591         41318         58682         01409         60042         33           32         39958         98588         41370         58630         01412         59445         34           4006         98584         41422 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>   |    |           |           |             |                 |             |            |      |
| 21         39418         98623         40795         59905         01377         60882         38           22         39467         98620         40847         59153         01380         60883         38           24         39566         98614         40952         59048         01866         60434         36           25         39615         98601         41057         58995         01390         60385         35           26         39664         98607         41057         58943         01393         60336         34           27         39713         98604         41109         58891         01396         60287         32           28         39762         98601         41161         58899         01399         60238         32           29         39811         98597         41214         58786         01403         60189         31           30         9.39860         9.98594         9.41266         10.58734         10.01406         10.60140         90           31         39909         98591         41318         58682         01409         60091         31           32         39958  | 20 | 9 . 39369 | 9 . 98627 | 9 . 40742   | 10.59258        | 10.01373    | 10 .60631  | 40   |
| 22         39467         98690         40847         59153         01380         60483         38           24         39566         98614         40952         59048         01383         60483         37           25         39615         98610         41005         58995         01390         60836         35           26         39664         98607         41057         58943         01393         60385         34           27         39713         98604         41109         58891         01396         60287         33           28         39762         98601         41161         58899         01399         60238         32           29         39811         98597         41214         58786         01403         60189         31           30         9.3860         9.8594         9.41266         10.58734         10.01406         10.60140         39           31         39958         98586         41370         58690         01412         60042         28           33         40066         98584         41422         58578         01416         59945         36           40152         98574   |    |           |           |             |                 |             |            | 39   |
| 28         39517         98617         40900         59100         01888         60483         37           24         39566         98614         40952         59048         01886         60434         36           25         39615         98610         41005         58995         01390         60385         35           26         39664         98607         41057         58943         01993         60385         34           27         39713         98604         41161         58899         01396         60287         33           28         39762         98601         41161         58899         01399         60238         32           29         39811         98597         41214         58786         01403         60189         31           31         39909         98594         9.41266         10.58734         10.01406         60042         33           31         39909         98584         41370         58682         01409         60042         33           33         40066         98584         41370         58630         01412         59944         37           34         40055         98  |    |           |           |             |                 |             |            | .28  |
| 24         39566         98614         40952         59048         01866         60434         36           25         39615         98610         41005         58995         01390         60336         34           26         39664         98607         41057         58943         01393         60336         34           27         39713         98604         41109         58891         01396         60287         33           28         39762         98601         41161         58839         01399         60189         32           29         39860         9.8591         41214         58682         01403         60189         31           30         9.3960         9.8591         41318         58682         01409         60091         29           31         39909         98591         41318         58682         01409         60091         29           32         39958         98588         41370         58630         01412         50042         28           33         40065         98581         41744         58526         01419         59945         36           45         40162         98574 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>37</td>   |    |           |           |             |                 |             |            | 37   |
| 25         39615         98610         41005         58995         01390         60385         \$5           26         39664         98607         41057         58943         01393         60385         \$3           27         39713         98604         41109         58891         01399         60238         \$3           28         39762         98601         41161         58839         01399         60238         \$3           29         39811         98597         41214         58786         01403         60189         \$1           30         9.39660         9.8591         41218         58682         01409         60041         \$3           31         39909         98591         41318         58682         01409         \$0         90         \$9         \$9         \$9         \$0<  |    |           |           |             |                 |             |            | 1 36 |
| 26         39664         98007         41057         58943         01993         60336         34           27         39713         98604         41109         58891         01396         60287         33           28         39762         98601         41161         58839         01399         60287         32           29         39811         98597         41214         58786         01403         60189         31           30         9.39860         9.98594         9.41266         10.58734         10.01406         10.60140         30           31         39909         98591         41318         58682         01409         60091         29           32         39958         98588         41370         58630         01412         60042         28           33         40065         98584         41422         58878         01416         59944         27           34         40055         98581         41474         58526         01419         59842         25           36         40152         98574         41578         58422         01426         59848         24           37         40200  |    |           |           |             |                 |             |            |      |
| 27         39713         98604         41109         58891         01396         60287         33           28         39762         98601         41161         58899         01399         60238         33           29         39811         98597         41214         58786         01403         60189         31           30         9.38560         9.98594         9.41266         10.58734         10.01406         10.60140         30           31         39909         98591         41318         58682         01409         60042         23           32         39958         98588         41370         58630         01412         60042         23           33         40006         98584         41474         58526         01419         59945         36           40103         98578         41526         58474         01422         59872         25           36         40152         98574         41578         58422         01429         59800         25           37         40020         98561         41621         58919         01492         59800         25           38         40249         98568   |    |           |           |             |                 |             |            |      |
| 28         39762         98601         41161         58839         01399         60238         33           29         39811         98597         41214         58786         01403         60189         31           30         9.39860         9.98594         9.41266         10.58734         10.01406         10.60140         30           31         39909         98591         41318         58682         01409         60042         28           33         40006         98584         41370         58630         01412         60042         28           34         40055         98581         41474         58526         01419         59944         25           35         40103         98578         41526         58474         01422         59897         25           36         40152         98574         41578         58422         01426         59848         24           37         40200         98571         41629         58371         01429         59800         25           38         40249         98568         41681         58919         01435         59703         21           40         9.40346  |    |           |           |             |                 |             |            |      |
| 29         39811         98597         41214         58786         01403         60189         31           30         9.39860         9.98594         9.41266         10.58734         10.01406         10.60140         30           31         39909         98591         41318         58682         01409         60091         29           32         39958         98588         41370         58630         01412         60042         28           33         40006         98584         41474         58526         01419         59945         36           34         40055         98581         41474         58526         01419         59945         36           35         40103         98578         41526         58474         01422         59877         25           37         40200         98571         41629         58371         01429         59800         23           38         40249         98568         41681         58319         01432         59751         21           40         9.40346         9.98561         9.41784         10.5216         10.01439         10.59654         20           41         4039   |    |           |           |             |                 |             |            |      |
| 30         9.3860         9.8594         9.41266         10.58734         10.01406         10.60140         30           31         39909         98591         41818         58682         01409         60091         23           32         39958         98588         41370         58630         01412         60042         28           33         40006         98584         41474         58526         01419         59945         26           34         40055         98581         41474         58526         01419         59945         26           35         40103         98578         41526         58474         01422         59872         25           36         40152         98574         41578         58422         01426         59848         24           37         40200         98571         41629         58371         01429         59800         25           38         40249         98568         41681         58319         01432         59751         21           40         9.40346         9.98561         9.41784         10.58216         10.01439         10.59654         20           41         40394   |    |           |           |             |                 |             |            |      |
| S1         39909         98591         41318         58682         01409         60091         29           32         39958         98588         41370         58630         01412         60042         28           33         40066         98584         41474         58578         01416         59994         97           34         40055         98581         41474         58526         01419         59945         26           35         40103         98578         41526         58474         01422         59897         25           36         40152         98574         41578         58422         01426         59848         24           37         40200         98571         41629         58971         01429         59800         23           38         40249         98565         41733         58267         01435         59703         21           40         9.40346         9.98561         9.41784         10.58216         10.01439         10.59654         20           41         40394         98558         41887         58113         01445         59606         19           42         40442  |    |           |           |             |                 | <u></u>     |            |      |
| 32         39988         98588         41370         58630         01412         60042         28           33         4006         98584         41422         58578         01416         59994         37           34         40055         98581         41474         58526         01419         59945         26           45         40103         98578         41578         58474         01422         59897         25           36         40152         98574         41578         58422         01426         59848         24           37         40200         98571         41629         58371         01429         59800         23           38         40249         98568         41681         58319         01432         59761         22           39         40249         98565         41733         58267         01435         59703         21           40         9.40346         9.98561         9.41784         10.58216         10.01439         10.59654         20           41         40394         98558         41836         58164         01442         59606         19           42         40442   |    |           |           |             |                 |             |            |      |
| 33         40006         98584         41422         58578         01416         59994         27           34         40055         98581         41474         58526         01419         59845         26           25         40103         98578         41526         58474         01422         59897         25           36         40152         98574         41578         58422         01426         59848         24           37         40200         98571         41629         58871         01429         59800         23           38         40249         98568         41681         58319         01432         59751         22           39         40297         98565         41783         58267         01435         59703         21           40         9.40346         9.98561         9.41784         10.58216         10.01439         10.59654         20           41         40394         98558         41836         58164         01442         59606         19           42         40442         98555         41887         58113         01445         59558         18           43         40460  |    |           |           |             |                 |             | ,          |      |
| 34         40055         98581         41474         58526         01419         59945         26           25         40103         98578         41526         58474         01422         59897         25           36         40152         98574         41578         58422         01426         59848         24           37         40200         98571         41629         58871         01429         59800         23           38         40249         98568         41681         58319         01432         59751         21           39         40297         98565         41783         58267         01435         59703         21           40         9.40346         9.98561         9.41784         10.58216         10.01439         10.59654         20           41         40394         98558         41836         58164         01442         59606         19           422         40442         98555         41887         58113         01445         59550         18           43         40490         98551         41939         58061         01449         595510         17           44         40538  |    |           |           |             |                 |             |            |      |
| 35         40103         98578         41526         58474         01422         59897         25           36         40152         98574         41578         58422         01426         59848         24           37         40200         98571         41629         58371         01429         59800         23           38         40249         98568         41681         58819         01432         59751         22           39         40297         98565         41733         58267         01435         59703         21           40         9.40346         9.98561         9.41784         10.58216         10.01439         10.59654         20           41         40394         98558         41836         58164         01442         59606         19           42         40422         98555         41887         58113         01445         59558         18           43         40490         98551         41939         58061         01449         59510         16           45         40586         98548         41990         58010         01452         59462         16           45         40586  |    |           |           |             |                 | l .         |            |      |
| 36         40152         98574         41578         \$8422         01426         59848         24           37         40200         98571         41629         58371         01429         59800         23           38         40249         98568         41681         58319         01432         59751         21           39         40297         98565         41783         58267         01435         59703         21           40         9.40346         9.98561         9.41784         10.58216         10.01439         10.59654         20           41         40394         9.8558         41836         58164         01442         59606         19           42         40442         98555         41887         58113         01445         59558         18           43         40490         98551         41939         58061         01449         59510         17           41         40538         98548         41990         58010         01452         59462         16           45         40568         98545         42041         57959         01455         59414         15           46         40634  |    |           |           |             |                 |             |            |      |
| 37         40200         98571         41629         58371         01429         59800         23           38         40249         98568         41681         58319         01432         59751         21           40         9.40346         9.98561         9.41784         10.58216         10.01439         10.59654         20           41         40394         98558         41836         58164         01442         59606         19           42         40442         98555         41887         58113         01445         59558         18           43         40490         98551         41939         58061         01449         59510         17           41         40538         98548         41990         58010         01452         59462         16           4.5         40586         98545         42041         57959         01455         59414         15           46         40634         98541         42093         57907         01459         59368         14           47         40682         98538         42195         57805         01465         59270         12           49         40778   |    |           |           |             |                 |             |            |      |
| 38         40249         98568         41681         58319         01432         59751         21           39         40297         98565         41783         58267         01435         59703         21           40         9.40346         9.98561         9.41784         10.58216         10.01439         10.59654         20           41         40394         98558         41836         58164         01442         59606         19           42         40442         98555         41887         58113         01445         59558         18           43         40490         98551         41939         58061         01449         59510         17           44         40538         98548         41990         58010         01452         59462         16           45         40586         98545         42041         57959         01455         59414         15           46         40634         98531         42093         57907         01459         59366         14           47         40682         98538         42144         57856         01465         59270         12           49         40730  |    |           |           |             |                 |             |            | 1 8  |
| 39         40297         98565         41783         58267         01435         59703         21           40         9.40346         9.98561         9.41784         10.58216         10.01439         10.59654         20           41         40394         98558         41836         58164         01442         59606         19           42         40442         98555         41887         58113         01445         59558         18           43         40490         98551         41939         58061         01449         59510         17           44         40538         98548         41990         58010         01452         59462         16           45         40586         98545         42041         57959         01455         59414         15           46         40634         98541         42093         57907         01459         59366         14           47         40682         98538         42144         57856         01462         59318         13           48         40730         98535         42195         57805         01465         59270         12           49         40778  |    |           |           |             |                 |             |            |      |
| 40         9.40346         9.98561         9.41784         10.58216         10.01439         10.59654         20           41         40394         98558         41836         58164         01442         59606         19           42         40442         98555         41887         58113         01445         59558         18           43         40490         98551         41939         58061         01449         59510         17           41         40538         98548         41990         58010         01452         59462         16           45         40586         98545         42041         57959         01455         59414         15           46         40634         98541         42093         57907         01455         59366         14           47         40682         98538         42144         57856         01462         59318         13           48         40730         98535         42195         57805         01465         59270         12           49         40778         98531         42246         57754         01469         59222         11           50         9.40825  |    | 40249     | 98568     | 41681       |                 |             |            |      |
| 41         40394         98558         41836         58164         01442         59606         19           42         40442         98555         41887         58113         01445         59558         18           43         40400         98551         41939         58061         01449         59510         16           41         40538         98548         41990         58010         01452         59462         16           45         40586         98545         42041         57959         01455         59414         15           46         40634         98541         42093         57907         01459         59366         14           47         40682         98538         42144         57856         01462         59318         14           48         40730         98535         42195         57805         01465         59270         12           49         40778         98531         42246         57754         01469         59222         11           50         9.40825         9.98528         9.42297         10.57703         10.01472         10.59175         10           51         40873  | 39 | 40297     | 98565     | 41783       | 58267           | 01435       | 59703      | _    |
| 42         40442         98555         41887         58113         01445         59558         18           43         40490         98551         41939         58061         01449         59510         17           41         40538         98548         41990         58010         01452         59462         16           45         40586         98545         42041         57959         01455         59414         15           46         40634         98541         42093         57907         01459         59366         14           47         40682         98538         42144         57856         01462         59318         13           48         40730         98535         42195         57805         01465         59270         12           49         40778         98531         42246         57754         01469         59222         11           50         9.40825         9.98528         9.42297         10.57703         10.01472         10.59175         10           51         40873         98525         42348         57652         01475         59127         9           52         40921   |    |           |           |             |                 |             |            |      |
| 43         40490         98551         41939         58061         01449         59510         17           41         40538         98548         41990         58010         01452         59462         16           4.5         40586         98545         42041         57959         01455         59414         15           46         40634         98541         42099         57907         01459         59366         14           47         40682         98538         42144         57856         01462         59318         13           48         40730         98535         42195         57805         01465         59270         12           49         40778         98531         42246         57754         01469         59222         11           50         9.40825         9.98528         9.42297         10.57703         10.01472         10.59175         10           51         40873         98521         42348         57652         01475         59127         9           52         40921         98521         42399         57601         01479         59079         8           53         40968   |    |           |           |             |                 |             |            |      |
| 44         40538         98548         41990         58010         01452         59462         16           45         40586         98545         42041         57959         01455         59414         15           46         40634         98541         42093         57907         01459         59366         14           47         40682         98538         42144         57856         01462         59318         13           48         40730         98535         42195         57805         01465         59270         12           49         40778         98591         42246         57754         01469         59222         11           50         9.40825         9.98528         9.42297         10.57703         10.01472         10.59175         10           51         40873         98525         42348         57652         01475         59127         9           52         40921         98521         42399         57601         01479         59079         8           53         40968         98518         42450         57550         01482         59032         7           54         4106 <td< td=""><td></td><td>I</td><td></td><td></td><td></td><td></td><td></td><td></td></td<>   |    | I         |           |             |                 |             |            |      |
| 4.5         40586         98545         42041         57959         01455         59414         15           46         40634         98541         42098         57907         01459         59366         14           47         40682         98538         42144         57856         01462         59318         14           48         40730         98535         42195         57805         01465         59270         12           49         40778         98531         42246         57754         01469         59292         11           50         9.40825         9.98528         9.42297         10.57703         10.01472         10.59175         10           51         40873         98525         42348         57652         01475         59127         9           52         40921         98521         42399         57601         01479         59079         8           53         40968         98518         42450         57550         01482         59032         7           54         41016         98515         42501         57499         01485         58984         6           55         41063 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>   |    |           |           |             |                 |             |            |      |
| 46         40634         98541         42093         57907         01459         59366         14           47         40682         98538         42144         57856         01462         59318         13           48         40730         98535         42195         57805         01465         59270         12           49         40778         98531         42246         57754         01469         59222         11           50         9.40825         9.98528         9.42297         10.57703         10.01472         10.59175         10           51         40873         98525         42348         57652         01475         59127         9           52         40921         98521         42399         57601         01479         59079         8           53         40968         98518         42450         57550         01482         59032         7           54         41016         98515         42501         57499         01485         5894         6           55         41063         98511         42252         57448         01489         58887         5           56         41111         9  |    |           |           |             |                 |             |            |      |
| 47         40682         98538         42144         57856         01462         59318         13           48         40730         98535         42195         57805         01465         59270         12           49         40778         98531         42246         57754         01469         59222         11           50         9.40825         9.98528         9.42297         10.57703         10.01472         10.59175         10           51         40873         98525         42348         57652         01475         59127         9           52         40921         98521         42399         57601         01479         59079         8           53         40968         98518         42450         57550         01482         59032         7           54         41016         98515         42501         57499         01485         5894         6           55         41063         98511         42552         57448         01489         58987         5           56         41111         98508         42603         57397         01492         58894         6           57         41158         98  |    |           |           |             |                 |             |            | •    |
| 48         40730         98535         42195         57805         01465         59270         12           49         40778         98591         42246         57754         01469         59222         11           50         9.40825         9.98528         9.42297         10.57703         10.01472         10.59175         10           51         40873         98525         42348         57652         01475         59127         9           52         40921         98521         42399         57601         01479         59079         8           53         40968         98518         42450         57550         01482         59032         7           54         41016         98515         42501         57499         01485         58984         6           55         41063         98511         42552         57448         01489         58987         5           56         41111         98508         42603         57397         01492         58889         4           57         41158         98505         42653         57347         01495         58842         3           58         41205         98  |    |           |           |             |                 |             | •          |      |
| 49         40778         98531         42246         57754         01469         59222         11           50         9.40825         9.98528         9.42297         10.57703         10.01472         10.59175         10           51         40873         98525         42348         57652         01475         59127         9           52         40921         98521         42399         57601         01479         59079         8           53         40968         98518         42450         57550         01482         59032         7           54         41016         98515         42501         57499         01485         58984         6           55         41063         98511         42552         57448         01489         58987         5           56         41111         98508         42603         57397         01492         58889         4           57         41158         98505         42653         57347         01495         58842         3           58         41205         98501         42704         57296         01499         58795         2           59         41252         984  |    |           |           |             |                 |             |            |      |
| 50         9.40825         9.98528         9.42297         10.57703         10.01472         10.59175         10           51         40873         98525         42348         57652         01475         59127         8           52         40921         98521         42349         57601         01479         59079         8           53         40968         98518         42450         57550         01482         59032         7           54         41016         98515         42501         57499         01485         58984         6           55         41063         98511         42552         57448         01489         58987         5           56         41111         98508         42603         57397         01492         58889         4           57         41158         98505         42653         57347         01495         58842         3           58         41205         98501         42704         57296         01499         58795         9           59         41252         98498         42755         57245         01502         58748         1           60         41300         9849  |    |           |           | 1           |                 |             |            |      |
| 51         40873         98525         42348         57652         01475         59127         9           52         40921         98521         42399         57601         01479         59079         8           53         40968         98518         42450         57550         01482         59032         7           54         41016         98515         42501         57499         01485         58984         6           55         41063         98511         42552         57448         01489         58987         5           56         41111         98508         42603         57397         01492         58889         4           57         41158         98505         42653         57347         01495         58842         3           58         41205         98501         42704         57296         01499         58795         9           59         41252         98498         42755         57245         01502         58748         1           60         41300         98494         42805         57195         01506         58700         0  | 49 | 40778     | 98531     | 42246       | 57754           | 01469       | 59222      | _    |
| 52         40921         98521         42399         57601         01479         59079         8           53         40968         98518         42450         57550         01482         59032         7           54         41016         98515         42501         57499         01485         58964         6           55         41063         98511         42552         57448         01489         58987         5           56         41111         98508         42603         57397         01492         58889         4           57         41158         98505         42653         57347         01495         58842         3           58         41205         98501         42704         57296         01499         58795         9           59         41252         98498         42755         57245         01502         58748         1           60         41300         98494         42805         57195         01506         58700         0   |    | 1         |           |             |                 |             |            |      |
| 53         40968         98518         42450         57550         01482         59032         7           54         41016         98515         42501         57499         01485         58984         6           55         41063         98511         42552         57448         01489         58987         5           56         41111         98508         42603         57397         01492         58889         4           57         41158         98505         42653         57347         01495         58842         3           58         41205         98501         42704         57296         01499         58795         9           59         41252         98498         42755         57245         01502         58748         1           60         41300         98494         42805         57195         01506         58700         0  |    |           |           |             | 1 1 1 1 1 1 1 1 |             |            | 1 -  |
| 54         41016         98515         42501         57499         01485         58984         6           55         41063         98511         42552         57448         01489         58987         5           56         41111         98508         42603         57397         01492         58889         4           57         41158         98505         42653         57347         01495         58842         3           58         41205         98501         42704         57296         01499         58795         2           59         41252         98498         42755         57245         01502         58748         1           60         41300         98494         42805         57195         01506         58700         0   |    | 40921     |           |             |                 |             |            |      |
| 55         41063         98511         42552         57448 .         01489         58987         5           56         41111         98508         42603         57397         01492         58889         4           57         41158         98505         42653         57347         01495         58842         3           58         41205         98501         42704         57296         01499         58795         2           59         41252         98498         42755         57245         01502         58748         1           60         41300         98494         42805         57195         01506         58700         0  |    |           |           |             |                 |             |            |      |
| 56         41111         98508         42603         57397         01492         58889         4           57         41158         98505         42658         57347         01495         58842         3           58         41205         98501         42704         57296         01499         58795         9           59         41252         98498         42755         57245         01502         58748         1           60         41300         98494         42805         57195         01506         58700         0   |    |           |           |             |                 |             |            |      |
| 57         41158         98505         42653         57347         01495         58842         3           58         41205         98501         42704         57296         01499         58795         2           59         41252         98498         42755         57245         01502         58748         1           60         41300         98494         42805         57195         01506         58700         0  |    | 41063     |           |             | 57448.          |             |            |      |
| 58         41205         98501         42704         57296         01499         58795         2           59         41252         98498         42755         57245         01502         58748         1           60         41300         98494         42805         57195         01506         58700         0   | 56 | 41111     | 98508     | 42603       | 57397           | 01492       | 58889      |      |
| 59         41252         98498         42755         57245         01502         58748         1           60         41300         98494         42805         57195         01506         58700         0  |    | 41158     | 98505     | 42653       | 57847           | 01495       |            |      |
| 60         41300         98494         42805         57195         01506         58700         0   | 58 | 4120,5    | 98501     | 42704       | 57296           | 01499       |            |      |
|  | 59 |           | 98498     | 42755       | 57245           | 01502       | 58748      |      |
| Co-sine.   Sine.   Co-tangent.   Tangent.   Co-secant.   Secant.   M.  | 60 | 41300     | 98494     | 42805       | 57195           | 01506       | 58700      | 0    |
|  |    | Co-sine.  | Sine.     | Co-tangent. | Tangent.        | 'Co-secanti | Secant.    | M.   |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

| _          | 1                  | <del></del>   | 15 D                     | egrees.                |                        |                          | 1       |
|------------|--------------------|---------------|--------------------------|------------------------|------------------------|--------------------------|---------|
| М.         | Sine.              | Co-sine.      | Tangent.                 | Co-tangent.            | Secant.                | Co-secant.               | <u></u> |
| ٥          | 9.41300            | 9.98494       | 9 . 42805                | 10.57195               | 10.01506               | 10 . 58700               | 60      |
| 1          | 41947              | 98491         | 42856                    | 57144                  | 01509                  | <b>5</b> 8653            | 59      |
| 2          | 41394              | 98488         | 42906                    | 57094                  | 01512                  | 58606                    | 58      |
| 8          | 41441              | 98484         | 42957                    | 57043                  | 01516                  | 58559                    | 57      |
| 4          | 41488              | 98481         | 49007                    | <b>\$</b> 6993         | 01519                  | 58512                    | 56      |
| 3          | 41535              | 98477         | 48057                    | 56943                  | 01523                  | 58465                    | 55      |
| 6          | 41582              | 98474         | 43108                    | 56892                  | -01526                 | 58418                    | 54      |
| 7          | 41628              | 98471         | 43158                    | 56842                  | 01529                  | 58372                    | 58      |
| 8          | 41675              | 98467         | •                        |                        | 01533                  | 5832 <i>5</i>            | 52      |
| 9          | 41722              | 98464         | 43208                    | 56792                  | 01535<br>01536         | 58278                    | 51      |
| 10         | ·                  |               | 43258                    | 56742                  |                        |                          |         |
| 11         | 9.41768            | 9.98460       | 9.43808                  | 10.56692               | 10.01540               | 10.58232                 | 50      |
| 12         | 41815              | 98457         | 48358                    | 56642                  | 01543                  | 58185                    | 49      |
| 13         | 41861              | 98453         | 45408                    | 56592                  | 01547                  | <i>5</i> 8139            | - 48    |
|            | 41908              | 98450         | . 49458                  | 56549                  | <b>0</b> 1 <i>55</i> 0 | 58092                    | 47      |
| 14         | 41954              | 98447         | <b>435</b> 08            | 56492                  | <b>01<i>5</i></b> 53   | <b>5804</b> 6            | 46      |
| 15         | <b>490</b> 01      | 98443         | . <b>4</b> 3 <b>5</b> 58 | <b>5644</b> 2          | · 01 <i>5</i> 57       | ′ <b>5</b> 7 <b>9</b> 99 | 45      |
| 16         | 42047              | 98440         | 43607                    | <i>5</i> 6 <b>3</b> 93 | 01560                  | <b>579</b> 53            | 44      |
| 17         | 42093              | 98436         | 43657                    | <b>5634</b> 3          | 01564                  | 57907                    | 43      |
| 18         | 42140              | 98433         | 48707                    | <i>5</i> 6293          | 01567                  | <b>578</b> 60            | 42.     |
| 19         | 42186              | 98429         | 43756                    | 56244                  | 01571                  | 57814                    | 41      |
| 20         | 9.42232            | 9.98426       | 9.43806                  | 10.56194               | 10 .01574              | 10.57768                 | 40      |
| . 21       | 42278              | 98422         | 43855                    | 56145                  | 01578                  | 57722                    | 39      |
| 22         | 42324              | 98419         | 43905                    | 56095                  | 01\$81                 | <b>576</b> 76            | 38      |
| 28         | 42370              | 9844.5        | 48954                    | <b>560</b> 46          | 01585                  | <b>5763</b> 0            | 37      |
| 24         | 42416              | 98412         | 44004                    | 55996                  | 01468                  | <b>57584</b>             | · 36    |
| 25         | <b>424</b> 61      | 98409         | 44053                    | . 55 <b>04</b> 7       | ·01 <i>5</i> 91        | 57 <b>5</b> 39           | 85      |
| 26         | 42507              | 98405         | 44102                    | <b>558</b> 98          | 01 <b>.9</b> 95        | 57498                    | 34      |
| 27         | 42553              | 98402         | 44151                    | <b>558</b> 49          | 01.898                 | 57 <b>4</b> 47           | 33      |
| - 28       | 42599              | 98398         | 44201                    | <i>55</i> 799          | 01602                  | 57401                    | :32     |
| 29         | 4 <del>2</del> 644 | 96395         | 44250                    | <i>5575</i> 0          | .01605                 | <i>5</i> 7 <b>3</b> 56   | 131     |
| 30         | 9.42690            | . 9.98591     | 9.44290                  | 10.55701               | 10.01609               | 10.57310                 | 30      |
| 31         | <b>42</b> 735      | <b>983</b> 88 | <b>443</b> 48            | <b>856</b> 52          | 01612                  | 57965                    | 29      |
| 32         | 42781              | 98384         | 44997                    | <i>55</i> <b>6</b> 03  | 01616                  | 57219                    | 28      |
| 33         | 42826              | 98981         | · <b>4444</b> 6          | 55554                  | 01619                  | 57174                    | 27      |
| 34         | 42872              | 98377         | 44495                    | · <b>555</b> 05        | 01623                  | 57128                    | 26      |
| 35         | 42917              | 98373         | 44544                    | <b>554</b> 56          | 01627                  | 57083                    | 25      |
| 36         | <b>429</b> 62      | 98970         | 44592                    | 55408                  | 01630                  | <i>5</i> 7038            | 24      |
| 37         | 49007              | 98366         | 44641                    | <b>553</b> 59          | 01634                  | . <b>5</b> 6993          | 23      |
| 38         | <b>430</b> 53      | 98363         | 44690                    | <i>55</i> <b>9</b> 10  | 01637                  | 56947                    | 22      |
| 39         | 43098              | 98359         | 44798                    | 55 <b>2</b> 62         | 01641                  | 56902                    | 21      |
| 40         | 9.48143            | 9.98356       | 9.44787                  | 10.55213               | 10.01644               | 10 . 56857               | 20      |
| 41         | 43188              | 98352         | 44836                    | - 55164                | 01648                  | 56812                    | 19      |
| 42         | 43253              | <b>9834</b> 9 | 44884                    | 55116                  | 01651                  | 56767                    | 18      |
| 48         | 43278              | 98845         | 44933                    | <b>550</b> 67          | 01655                  | 56722                    | 17      |
| 44         | 48523              | 98342         | 44981                    | <i>55</i> 019          | 01658                  | 56677                    | 16      |
| 45         | 43367              | 98838         | 45029                    | 54971                  | 01662                  | 56633                    | 15      |
| 46         | 48412              | 98934         | 45078                    | 54922                  | O <b>1</b> 666         | 56588                    | 14      |
| 47         | 49457              | 98381         | 45126                    | 54874                  | 01669                  | 56543                    | 13      |
| 48         | 49502              | 98827         | 45174                    | 54826                  | 01679                  | 56498                    | 19      |
| 49         | 43546              | 98324         | 45222                    | 54778                  | 01676                  | 56454                    | ii      |
| 50         | 9.43591            | 9.98320       | 9.45271                  | 10.54729               | 10.01680               | 10 . 56409               | 10      |
| 51         | 49635              | 98817         | 45819                    | 54681                  | 01683                  | <i>\$</i> 6965           | 9       |
| 52         | 48680              | 98313         | 45867                    | 5463 <b>3</b>          | 01687                  | 56320                    | 8       |
| <i>6</i> 8 | 48724              | 98309         | 45415                    | 54585                  | 01691                  | 56276                    | 7       |
| .54        | 48769              | <b>989</b> 06 | 45463                    | 54587                  | 01694                  | 56231                    | 6       |
| 55         | 48813              | 96302         | 45511                    |                        |                        |                          |         |
| 56         |                    |               |                          | 54489                  | 01698                  | 56187                    | 5       |
| 57         | 48857<br>48901     | 98299         | <b>455</b> 59            | <b>544</b> 41          | 01701                  | 56143                    | 4       |
|            | 48901              | 98295         | <b>456</b> 06            | 54994                  | 01705                  | 56099                    | 3       |
| 58         | 49946              | 98291         | 45654                    | 54946                  | 01709                  | 66054                    | 2       |
| 59<br>60   | 43990<br>44094     | 98288         | 45702                    | , 54298                | 01719                  | 56010<br>55000           | 1       |
|            | 44084              | 98284         | 45750                    | 54250                  | 01716                  | 55966                    |         |
| '          | Co-sine.           | Sine.         | Co-tangent.              | Tangent.               | Co-secunt.             | Secant.                  | M.      |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|                          |                  |                | 16 De          | grees.         |                            | . 1                   |          | -19        |
|--------------------------|------------------|----------------|----------------|----------------|----------------------------|-----------------------|----------|------------|
| M.                       | Sine.            | Co-Sine.       | Tangent.       | Co-tangent.    | Secant.                    | Co-secant.            |          | П          |
| 0                        | 9.44034          | 9.98284        | 9 . 45750      | 10.54250       | 1001716                    | 10.55966              | 60       |            |
| 1                        | 44078            | 98281          | 45797          | 54203          | 01719                      | 55922                 | 59       |            |
| 2                        | 44122            | 98277          | <b>4</b> 5845  | 541 <i>5</i> 5 | 01723                      | 55878                 | 58       | . 1        |
| 3                        | 44166            | 98278          | 45892          | 54108          | 01727                      | 55894                 | 57       |            |
| 4.                       | 44210            | 98270          | 45940          | 54060<br>54010 | 01730                      | . 55790               | 56       |            |
| 5<br>6                   | 44253            | 98266          | 45987          | 54013<br>53965 | 01784<br>01788             | 55747<br>55703        | 55<br>54 | 1          |
| 7                        | 44297<br>44341   | 98262<br>98259 | 46035<br>46082 | 53918          | 01741                      | 55659                 | 53       |            |
| 8                        | 44985            | 98255          | 46130          | 53870          | 01745                      | 55615                 | 52       | l l        |
| 9                        | 44428            | 98251          | 46177          | 53823          | 01749                      | 55572                 | 51       | П          |
| 10                       | 9.44472          | 9.98248        | 9.46224        | 10.53776       | 10.01752                   | 10.55528              | 50       | 1          |
| 11                       | 44516            | 98244          | 46271 •        | <i>5</i> 3729  | 01756                      | 55 <del>48</del> 4    | 49       | <b>a</b> 1 |
| 12                       | 44559            | 98240          | <b>46</b> 319  | <i>5</i> 3681  | 01760                      | 55441                 | 48       | 11         |
| 13                       | 44602            | 98237          | ,46S66         | 53634          | 01763                      | <i>55</i> 998         | 47       | 1          |
| 14                       | 44646            | 98233          | 46413          | <b>535</b> 87  | 01767                      | 55854<br>55811        | 46       | 1          |
| 15                       | 44689            | 98229          | 46460          | 53540<br>53493 | 01771<br>0177 <del>4</del> | 55267                 | 44       | l k        |
| 16<br>17                 | 44733<br>44776   | 98226<br>98222 | 46507<br>46554 | 53495<br>53446 | 01778                      | 55224                 | 43       | 1 1        |
| 18                       | 44819            | 98218          | 46601          | 53399          | 01782                      | 55181                 | 42       |            |
| 19                       | 44862            | 98215          | 46648          | 53352          | 01785                      | 55198                 | 41       |            |
| 20                       | 9 . 44905        | 9.98211        | 9.46694        | 10.53306       | 10.01789                   | 10 . 55095            | 40       | 1          |
| 21                       | 44948            | 98207          | 46741          | 53259          | 01793                      | 55052                 | 39       | 1          |
| 22                       | 44992            | 98204          | 46788          | 53212          | 01796                      | 55008                 | 38       | 1 1        |
| 23                       | 45035            | 98200          | 46835          | <b>5316</b> 5  | 01800                      | 5496 <i>5</i>         | 37       | 11         |
| 24                       | 45077            | 98196          | 46881          | 58119          | 01804                      | 5492 <b>3</b>         | 36       | ü ł        |
| 25                       | 45120            | 98192          | 46928          | 53072          | 01808                      | 54880                 | 35<br>34 | 11         |
| 26                       | 45163            | 98189          | 46975          | 53025<br>52979 | 01611<br>01815             | 54837<br>54794        | 33       |            |
| 27<br>28                 | 45206 /<br>45249 | 98185<br>98181 | 47021<br>47068 | 52919<br>52932 | 01819                      | 54751                 | 32       | 1          |
| 29                       | 45292            | 98177          | 47114          | 52886          | 01623                      | 54708                 | 31       | 1          |
| 30                       | 9 . 45334        | 9.98174        | 9.47160        | 10.52840       | 10.01826                   | 10.54666              | 30       | 1          |
| 91                       | 45377            | 98170          | 47907          | <b>5279</b> 3  | 01830                      | 54623                 | 29       | 1          |
| 32                       | 45419            | 98166          | 47253          | 52747          | 01834                      | 54581                 | 28       | I          |
| 33                       | 45462            | 98162          | 47299          | 52701          | 01838                      | <b>545</b> 38         | 27       | . ((       |
| 34                       | 45504            | 981.59         | 47346          | 52654          | 01841                      | 54496                 | 26       |            |
| 35                       | 45547            | 98155          | 47392          | 52608<br>52562 | 01845<br>01849             | 54453<br>54411        | 24       |            |
| 36<br>37                 | 45589<br>45632   | 98151<br>98147 | 47438<br>47484 | 52516          | 01853                      | 54368                 | 29       | . 18       |
| 38                       | 45674            | 98144          | 47530          | 52470          | 01856                      | <b>54326</b>          | 22       |            |
| 39                       | 45716            | .98140         | 47576          | 52424          | 01860                      | 54284                 | 21       |            |
| 40                       | 9 . 45758        | 9.98156        | 9 . 47622      | 10.52378       | 10 .01864                  | 10.54242              | 20       | 7          |
| 41                       | 45801            | 98132          | 47668          | 52332          | 01868                      | 54199                 | 19       |            |
| 42                       | 45843            | 98129          | 47714          | 52286          | 0187L                      | <b>5</b> 415 <b>7</b> | 18       |            |
| 48                       | 45895            | 98125          | 47760          | 52240          | 01875                      | 54115                 | 17       |            |
| 44                       | 45927            | 98121          | 47806          | 52194          | 01879                      | 54073                 | 16       |            |
| 45<br>46                 | 45969            | 98117          | 47852          | 52148          | 01883                      | 54031<br>53989        | 111      |            |
| 46<br>47                 | #46Q11<br>46053  | 98113<br>98110 | 47897<br>47943 | 52103<br>52057 | 01887                      | 53969<br>53947        | lis      |            |
| 48                       | 45095            | 98106          | 47989          | 52011          | 01894                      | 53905                 | li       |            |
| 49                       | 46136            | 98102          | 46035          | 51965          | 01898                      | 53864                 | ī        |            |
| 50                       | 9.46178          | 9.98098        | 9.48080        | 10.51920       | 10.01902                   | 10.53822              | 10       | 5          |
| 51                       | 46220            | 98094          | 48126          | 51874          | 01906                      | · <i>5</i> 3780       | 1 :      | 9          |
| 52                       | 46262            | 98090          | 48171          | 51829          | 01910                      | <b>53</b> 73 <b>8</b> | 1        | 8          |
| 58                       | 46303            | 98087          | 48217          | <i>5</i> 1783  | 01913                      | 53697                 |          | 7          |
| 54                       | 46345            | 98083          | 48262          | <i>5</i> 1738  | 01917                      | 58655<br>50014        |          | 6          |
| 55                       | 46386            | 98079          | 48307          | 51693          | 01921                      | 53614                 | 1        | 5          |
| 56                       | 46428            | 98075          | 48353          | 51647<br>51600 | , 01925<br>01929           | 53572<br>53531        | 1        | 4          |
| <i>5</i> 7<br><i>5</i> 8 | 46469<br>46511   | 98071<br>98067 | 48398<br>48443 | 51602<br>51557 | 01929                      | 53489                 | 1        | 3<br>2     |
| 59                       | 46511<br>46552   | 98067          | 48489          | 5151L          | 01933                      | 53448                 |          | ī          |
| 90                       | 46594            | 98060          | 48534          | 51466          | 01940                      | 53406                 |          | ō          |
|                          | Co-sine.         | Sine.          | Co-tangent.    | Tangent.       | Co-secant.                 | Secant.               | A        | Æ.         |
|                          |                  |                |                | 9              |                            |                       | .I       |            |

TABLE XI.

LOGARITHMIC SINES, TANGENTS, AND SECANTS.

| <b>I</b> — | L.                      | OGARITHM                   |                    |  | IND SECAN              | rs.                                 |          |
|------------|-------------------------|----------------------------|--------------------|--|------------------------|-------------------------------------|----------|
| l          |                         |                            |                    | egrees.                                |                        |                                     |          |
| M.         | Sine.                   | Co-sine.                   | Tangent.           | Co-tangent.                            | Secant.                | Co-secant.                          |          |
| 0          | 9.46594                 | 9.98060                    | 9.48534            | 10.51466                               | 10.01940               | 10.53406                            | 60       |
| 1          | 46635                   | 98056                      | 4 <del>8</del> 579 | 51421                                  | 019 <del>11</del>      | 53 <b>365</b>                       | 59       |
| 8.         | 46676                   | 98052                      | 48624              | 51376                                  | 01948                  | 53324                               | 58       |
| 3          | 46717                   | 98048                      | 48669              | 51331                                  | 01952                  | <i>5</i> 32 <b>86</b>               | 57       |
| 5          | 46758                   | 98044                      | 48714              | 51286                                  | 01956                  | 59242                               | 56       |
| 6          | 46800                   | 98040                      | 48759              | 51241                                  | 01960                  | 53200                               | 55       |
| 7          | 46841<br>46882          | 98036                      | 48804              | 51196                                  | 01964                  | 53159                               | 54       |
|            | 46923                   | 98032<br>98029             | 48849              | 51151                                  | 01968                  | 53118                               | 53       |
| 9          | 46964                   | 98025                      | 48894<br>48939     | 51106<br>51061                         | 01971<br>0197 <b>5</b> | 53977<br>53036                      | 52<br>51 |
|            |                         |                            |                    |  |                        |                                     |          |
| 10         | 9.47005                 | 9 . 98021                  | 9.48984            | 10.51016                               | 10.01979               | 10.52995                            | 50       |
| 11<br>12   | 47045                   | 98017                      | 49029              | 50971                                  | 01983                  | 52 <b>95</b> 5                      | 49       |
| 13         | 47086                   | 98018                      | 49078              | 50927                                  | 01987                  | 52914                               | 48       |
| 14         | 47127<br>47168          | 98009<br>98005             | 49118              | 50882                                  | 01991                  | 52873                               | 47       |
| 15         | 47909                   | 98001                      | 49163<br>49207     | <i>5</i> 083 <b>7</b><br><i>5</i> 0793 | 01995<br><b>0</b> 1999 | <b>528</b> 52<br><b>527</b> 91      | 46       |
| 16         | 47249                   | 97997                      | 49259              | 50748                                  | 02003                  | 52751                               | 45       |
| 17         | 47290                   | 97993                      | 49296              | 50704                                  | 02007                  | <i>5</i> 2710                       | 43       |
| 18         | 47930                   | 97989                      | 49341              | 50659                                  | 02011                  | 52670                               | 42       |
| 19         | 47371                   | 97986                      | 49385              | 50615                                  | 02014                  | 52629                               | 41       |
| 20         | 0 47111                 | 0 07000                    | 0 10100            | 10 50570                               | 10 00010               | 10 40400                            | <u> </u> |
| 20         | 9.47±11<br>47452        | 9.97982<br>97978           | 9 . 49430          | 10 . 50570<br>50526                    | 10.02018<br>02022      | 10 <b>. 5</b> 258 <b>9</b><br>52548 | 40       |
| 22         | 47492                   | 97974                      | 49474              | 50481                                  | 02022                  | 52508                               | 39       |
| 23         | 47593                   | 97970                      | 49519<br>49563     | 50487                                  | 02020                  | 52467                               | 38<br>37 |
| 24         | 47578                   | 97966                      | 49607              | 50393                                  | 02034                  | 52427                               | 36       |
| 25         | 47613                   | 97962                      | 496.52             | 50348                                  | 02038                  | 52387                               | 35       |
| . 26       | 47654                   | 97958                      | 49696              | 50304                                  | 02049.                 | 52346                               | 34       |
| 27         | 47694                   | 97954                      | 49740              | 50260                                  | ' 02046                | 52806                               | 33       |
| 28         | 47734                   | .97950                     | 49784              | 50216                                  | 02050                  | 52266                               | 32       |
| 29         | <b>47774</b>            | <b>9</b> 7946              | 49828              | 50172                                  | 02054                  | 52226                               | 31       |
| 30         | 9,47814                 | 9.97942                    | 9 . 49872          | 10.50128                               | 10.02058               | 10.52186                            | 30       |
| 31         | 47854                   | 97938                      | 49916              | 50084                                  | 02062                  | 52146                               | 29       |
| 32         | 47894                   | 97934                      | 49960              | 50040                                  | 02066                  | 52106                               | 28       |
| <b>3</b> 3 | 47934                   | 97930                      | 50004              | 49996                                  | 02070                  | 52066                               | 27       |
| 34         | 47974                   | 97926                      | <i>5</i> 0048      | 49952                                  | 02074                  | 52026                               | 26       |
| 35         | , 48014                 | 97922                      | 50)92              | 49908                                  | 02078                  | 51986                               | 25       |
| 36         | 48054                   | 97918                      | <i>5</i> 0136      | 49864                                  | 02082                  | 51946                               | 94       |
| 37         | 48094                   | 97914                      | .5018Q             | 49820                                  | 02086                  | 51906                               | 23       |
| 38<br>39   | 48133                   | 97910                      | 50223              | 49777                                  | 02090                  | 51867                               | 22       |
| 39         | 48173                   | 97906                      | 50267              | 49738                                  | 02094                  | 51827                               | 21       |
| 40         | 9.48213                 | 9.97902                    | 9.50811            | 10 . 49689                             | 10.02098               | 10.51787                            | 20       |
| 41         | 48252                   | 97898                      | <b>5</b> 0855      | 49645                                  | 02102                  | 51748                               | 19       |
| 42         | 48292                   | 97894                      | 50398              | 49602                                  | 02106                  | 51708                               | 18       |
| 43         | 48332                   | 97890                      | 50442              | 49558                                  | 02110                  | 51668                               | 17 .     |
| 44         | 48871                   | 97886                      | 50485              | 4951 <b>5</b>                          | 02114                  | 51629                               | 16       |
| 46         | 48411                   | 97882                      | 50529              | 49471                                  | . 02118                | 51 <b>5</b> 89                      | 15       |
| 47         | ` 48450                 | 97878                      | 50572<br>50016     | 49428                                  | 02122                  | . 51550                             | 14       |
| 48         | 48490<br>48 <i>5</i> 29 | 9787 <del>4</del><br>97870 | 50616<br>50650     | 49384<br>49341                         | 02126<br>02190         | 51510<br>51471                      | 18       |
| 49         | 48568                   | 97866                      | 50659<br>50708     | 49297                                  | 02134                  | 51432                               | 12       |
|            |                         |                            |                    |  |                        |                                     | <u> </u> |
| 50         | 9.48607                 | 9 . 97861                  | 9.50746            | 10.49254                               | 10.02139               | 10.51393                            | 10       |
| -51        | 48647                   | 97857                      | 50789              | 49211                                  | 09143                  | 51353                               | 9        |
| 52<br>53   | . 48686                 | 97853                      | 50893              | 49167                                  | 02147                  | 51314                               | 8        |
| 53<br>54   | 48725<br>48764          | 97849                      | 50876              | 49124                                  | 02151<br>02155         | 51275<br>51 <b>23</b> 6             | 7        |
| 55<br>55   | 48803                   | 97 <b>845</b><br>97841     | 50919              | 49081<br>49038                         | 02155                  | 51336<br>51197                      | 6        |
| <b>56</b>  | 48642                   | 97837                      | 50968<br>51005     | 48995                                  | 02159                  | 51158                               | 5        |
| 57         | 48681                   | 97833                      | 51048              | 48952                                  | 02167                  | 51119                               | 8        |
| 58         | 48990                   | : 97 <b>829</b>            | 51092              | 48908                                  | 02171                  | 51080                               | 2        |
| 59         | 48959                   | 97825                      | 51135              | 48865                                  | 02175                  | 51041                               | i        |
| 60         | 48998                   | 97821                      | 51178              | 48822                                  | 02179                  | 51002                               | o        |
|            | Continu                 |                            | J <del></del>      |  | <del></del>            |                                     | ·        |
|            | Co-sine.                | Sine.                      | Co-tangent.        | Tangent.                               | Co-secant.             | Secant.                             | M.       |
|            |                         |                            | 72 D               | egrees.                                |                        |                                     | <u>ا</u> |
| 100        |                         |                            |                    |  |                        |                                     |          |

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# TABLE XI.

.. LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|            | L                     | OGARITHM       |                                |                         | LOGARITHMIC SINES, TANGENTS, AND SECANTS.  18 Degrees. |                         |             |  |  |  |  |  |  |  |
|------------|-----------------------|----------------|--------------------------------|-------------------------|--|-------------------------|-------------|--|--|--|--|--|--|--|
|            |                       |                | 18 De                          |                         |  |                         | 1           |  |  |  |  |  |  |  |
| M.         | Sine.                 | Co-sine.       | Tangent.                       | Co-tangent.             | Secant.  | Co-secant.              |             |  |  |  |  |  |  |  |
| Ð          | 9.48938               | 9.97821        | 9:51178                        | 10.48822                | 10.02179   | 10.51002                | 60          |  |  |  |  |  |  |  |
| .1         | 49037                 | 97817          | 51221                          | 48779                   | 02183  | . 50963                 | 59          |  |  |  |  |  |  |  |
| 2          | 49076                 | 97812          | 51264                          | 48736                   | 02188  | 50924                   | 58          |  |  |  |  |  |  |  |
| 9          | 49115                 | 97808          | 51306                          | 48694                   | 02192  | . 50885                 | 57          |  |  |  |  |  |  |  |
| - 4        | 49153                 | 97804          | 513 <b>4</b> 9                 | 48651                   | 02196  | 50847                   | 56          |  |  |  |  |  |  |  |
| 5          | 49192                 | 97800          | 51392                          | 48608                   | 02200  | 50808                   | 55          |  |  |  |  |  |  |  |
| 6          | 49231                 | 97796          | 51435                          | 48565                   | 02204  | 50769                   | 54          |  |  |  |  |  |  |  |
| 7          | 49269                 | 97792          | 51478                          | 48522                   | 02208  | 50731                   | 53          |  |  |  |  |  |  |  |
| 8          | 49308                 | 97788          | 51520                          | 48480                   | 02212  | 50692<br>50653          | 52<br>51    |  |  |  |  |  |  |  |
| 9          | 49347                 | 97784          | 51563                          | 48437                   | 02216  | 20033                   | 31          |  |  |  |  |  |  |  |
| 10         | 9 . 49385             | 9.97779        | 9.51606                        | 10.48394                | 10.02221   | 10.50615                | 50          |  |  |  |  |  |  |  |
| 11         | 49424                 | 97775          | 51648                          | 48352                   | 02225  | 50576                   | 49          |  |  |  |  |  |  |  |
| 12         | 49462                 | 97771          | 51691                          | 48309                   | 02229  | 50538                   | 48          |  |  |  |  |  |  |  |
| 13         | 49500                 | 97767          | 5179 <del>4</del>              | 48266                   | 02233  | 50500                   | 47          |  |  |  |  |  |  |  |
| 14         | 49539                 | 97763          | 51776                          | 48224                   | 02237  | 50461                   | 46          |  |  |  |  |  |  |  |
| 15         | 49577                 | 97759          | 51819                          | . 48181                 | 02241  | 50423                   | 45          |  |  |  |  |  |  |  |
| 16         | 49615                 | 97754          | 51861                          | 48139                   | 02246  | 50385                   | 44          |  |  |  |  |  |  |  |
| 17         | 49654                 | 97750          | 51903                          | 48097                   | 02250  | 50346                   | 43          |  |  |  |  |  |  |  |
| 18         | 49692                 | 97746          | 51946                          | 48054                   | 02254  | 50308<br>50270          | 42          |  |  |  |  |  |  |  |
| 19         | 49730                 | 97742          | 51988                          | 48012                   | 02258  | 30210                   | 41          |  |  |  |  |  |  |  |
| 20         | 9.49768               | 9.97738        | 9.52031                        | 10 . 47969              | 10.02262   | 10 . 50232              | 40          |  |  |  |  |  |  |  |
| 21         | 49806                 | 97734          | 52073                          | 47927                   | 02266  | 50194                   | 39          |  |  |  |  |  |  |  |
| 22         | 49844                 | 97729          | 52115                          | 47885                   | 02271  | <i>5</i> 01 <i>5</i> 6  | 38          |  |  |  |  |  |  |  |
| 23         | 49882                 | 97725          | 52157                          | <b>4</b> 7843           | 02275  | 50118 ·                 | 37          |  |  |  |  |  |  |  |
| 24         | 49920                 | 97721          | 52200                          | 47800                   | 02279  | 50000                   | 36          |  |  |  |  |  |  |  |
| 25         | 49958                 | 97717          | 52242                          | <b>4</b> 7758           | 02283  | 50042                   | 35          |  |  |  |  |  |  |  |
| 26         | 49996                 | 97713          | 52284                          | 47716                   | 02287  | 50004                   | 34          |  |  |  |  |  |  |  |
| 27         | 50034                 | 97708          | <b>5</b> 2326                  | 47674                   | 02292  | 49966                   | 33          |  |  |  |  |  |  |  |
| 28         | 50072                 | 97704          | 52968                          | 47632                   | 02296  | 49928<br>49890          | 32          |  |  |  |  |  |  |  |
| 29         | 50110                 | 97700          | 52410                          | 47590                   | 02300  | 49090                   | 31          |  |  |  |  |  |  |  |
| 50         | 9.50148               | 9.97696        | 9.52452                        | 10 . 47548              | 10.02304   | 10.49852                | 30          |  |  |  |  |  |  |  |
| 31         | <i>5</i> 018 <i>5</i> | 97691          | 52494                          | 47506                   | 02809  | 49815                   | 29          |  |  |  |  |  |  |  |
| 32         | 50223                 | 97687          | <i>5</i> 2536                  | 47464                   | 02313  | 49777                   | 28          |  |  |  |  |  |  |  |
| 33         | <i>5</i> 0261         | . 97683        | <b>5</b> 2578                  | 47422                   | 02317  | 49739                   | 27          |  |  |  |  |  |  |  |
| 34         | 50298                 | 97679          | <b>5</b> 26 <b>2</b> 0         | 47380                   | 02321  | 49702                   | 26          |  |  |  |  |  |  |  |
| 35         | <i>5</i> 0336         | 97674          | 52661                          | 47539                   | 02326  | 49664                   | 25          |  |  |  |  |  |  |  |
| 36         | 50374                 | 97670          | 52703                          | 47297                   | 02330  | 49626                   | 24          |  |  |  |  |  |  |  |
| 37         | 50411                 | 97666          | 52745                          | 47255                   | 02534  | 49589<br>49 <b>5</b> 51 | 23<br>22    |  |  |  |  |  |  |  |
| 38         | 50449<br>50486        | 97669          | <b>527</b> 87                  | 47213                   | 02338<br>02343   | 49514                   | 21          |  |  |  |  |  |  |  |
| 39         | 30300                 | 97657          | 52829                          | 47171                   | 02010  | 13311                   |             |  |  |  |  |  |  |  |
| 40         | 9.50523               | 9.97653        | 9.52870                        | 10.47130                | 10.02347   | 10 . 49477              | 20          |  |  |  |  |  |  |  |
| 41         | 50561                 | 97649          | 52912                          | 47088                   | 02551  | 49439                   | 19          |  |  |  |  |  |  |  |
| 42         | 50598                 | 97645          | <b>529</b> 53                  | 47047                   | 02555  | 49402                   | 18          |  |  |  |  |  |  |  |
| 43         | 50635                 | 97640          | <i>5</i> 2 <b>9</b> 9 <i>5</i> | 47005                   | 02360  | 49865                   | 17          |  |  |  |  |  |  |  |
| 44         | 50673                 | 97636          | 59037                          | 46963                   | 02364  | 49527                   | 16          |  |  |  |  |  |  |  |
| 45         | 50710<br>50747        | 97632          | 53078                          | 46922                   | 02368  | 49290<br>49253          | 15          |  |  |  |  |  |  |  |
| 46<br>47   | 50747<br>50784        | 97627          | 53120                          | 46880                   | 02372<br>02377   | 49216                   | 13          |  |  |  |  |  |  |  |
| 48         | 50821                 | 97623<br>97619 | 53161<br>53202                 | 46 <b>9</b> 39<br>46798 | 02377  | 49179                   | 13          |  |  |  |  |  |  |  |
| 49         | 50858                 | 97619          | 53202<br>53244                 | 46756                   | 02385  | 49142                   | ii          |  |  |  |  |  |  |  |
|            |                       |                |                                |                         |  |                         | <del></del> |  |  |  |  |  |  |  |
| 50         | 9.50896               | 9.97610        | 9.53285                        | 10.46715                | 10 . 02390   | 10 . 49104              | 10          |  |  |  |  |  |  |  |
| . 51       | 50933                 | 97606          | 53327                          | 46673                   | 02594  | 49067                   | <b>1</b> 9  |  |  |  |  |  |  |  |
| 52         | 50970                 | 97602          | 53368                          | 46632                   | 02398  | 49030                   | 8           |  |  |  |  |  |  |  |
| 58         | 51007                 | 97597          | 53409                          | 46591                   | 02403  | 48993                   | 7           |  |  |  |  |  |  |  |
| 54         | 51048                 | 97593          | 5 450                          | 46550                   | 02407  | 48957                   | 5           |  |  |  |  |  |  |  |
| 55<br>56   | 51080<br>51117        | 97589          | 53492                          | 46508                   | 02411  | 48990<br>48883          | 4           |  |  |  |  |  |  |  |
| 50<br>57   | 51154                 | 97584          | 53533                          | 46467<br>46426          | 02410  | 48846                   | 3           |  |  |  |  |  |  |  |
| <i>5</i> 8 | 51191                 | 97580<br>97576 | 53574<br>53615                 | 46385                   | 02424  | 48809                   | 9           |  |  |  |  |  |  |  |
| 59         | 51227                 | 97571          | 53656                          | 46844                   | 02429  | 48773                   | li          |  |  |  |  |  |  |  |
| 60         | 51264                 | 97567          | 53697                          | 46303                   | 02433  | 48736                   | ō           |  |  |  |  |  |  |  |
|            |                       |                |                                |                         | ·  |                         | <u>.</u>    |  |  |  |  |  |  |  |
|            | Co-sine.              | Sine.          | Co-tangent.                    | Tangent.                | Co secant.   | Secant.                 | M.          |  |  |  |  |  |  |  |
| I          |                       |                | 71 De                          | grees.                  |  |                         | 1           |  |  |  |  |  |  |  |
| -          |                       |                |                                |                         | -  |                         |             |  |  |  |  |  |  |  |

TABLE XI.

| LOGARITHMIC SIN | IES. TANGENTS | . AND | SECANTS. |
|-----------------|---------------|-------|----------|
|-----------------|---------------|-------|----------|

|          |                                |                                  |                                  | egrees.                       |  |                        |          |
|----------|--------------------------------|----------------------------------|----------------------------------|-------------------------------|--|------------------------|----------|
| M.       | Sine.                          | Co-sine.                         | Tangent.                         | Co-tangent.                   | Secant.                                  | Co-secant.             |          |
| 0        | 9.51264                        | 9.97567                          | 9 . 53697                        | 10 . 46803                    | 10.02433                                 | 10.48736               | 60       |
| 1 2      | 51901<br>51337                 | 97568                            | 59738                            | 46262                         | 02437                                    | 48699                  | 59       |
| 3        | 51374                          | 97 <i>5</i> 58<br>97 <i>5</i> 54 | 53779<br>53820                   | <b>46221</b><br><b>4618</b> 0 | 0 <del>244</del> 2<br>0 <del>244</del> 6 | 48663<br>48626         | 58<br>57 |
| 4        | 51411                          | 97 <i>55</i> 0                   | 53861                            | 46189                         | 02450                                    | 48589                  | 56       |
| 5        | 51447                          | 97545                            | 53902                            | 46098                         | 02455                                    | 48553                  | 55       |
| 6        | 51484                          | 97541                            | 58943                            | 46057                         | 02459                                    | 48516                  | 54       |
| 7        | 51520                          | 97536                            | 53984                            | 46016                         | 02464                                    | 48480                  | 53       |
| 8        | 51557                          | 97592                            | 54025                            | 45975                         | 02468                                    | 48443                  | 52       |
| 9        | <b>5159</b> 3                  | 97528                            | 54065                            | 45985                         | 02472                                    | 48407                  | 51       |
| 10       | 9.51629                        | 9.97523                          | 9.54100                          | 10 . 45894                    | 10.02477                                 | 10.48371               | 50       |
| 11       | 51666                          | <b>975</b> 19                    | 54147                            | 458 <i>5</i> 3                | 02481                                    | 48334                  | 49       |
| 18       | 51702                          | <b>9</b> 7 <b>5</b> 15           | 54187                            | 45813                         | <b>Q24</b> 8 <i>5</i>                    | 48298                  | 48       |
| 13       | <b>3</b> 1738                  | 97510                            | 54228                            | 45772                         | <b>Q24</b> 90                            | · 48262                | 47       |
| 14       | 51774                          | 97506                            | 54269                            | 45731                         | 02494                                    | 48226                  | 46       |
| 15       | 51811<br>51847                 | 97 <i>5</i> 01                   | 54309                            | 45691                         | 02499                                    | 48189                  | 45       |
| 16       | 51847                          | 97497                            | <b>5485</b> 0                    | <b>45</b> 650                 | 02503                                    | 48153                  | 44       |
| 17<br>18 | 51883<br>51919                 | 97492<br>974-38                  | 54390<br>54421                   | 45610<br>4560                 | 02508<br>02512                           | 48117                  | 43       |
| 19       | \$1955                         | 97484                            | 54431<br>54471                   | 45569<br>45529                | 02512                                    | 48081<br>4804 <i>5</i> | 42<br>41 |
|          |                                |                                  |                                  |                               | <del></del>                              |                        |          |
| 20       | 9.51991<br>50007               | 9 • 97479                        | 9.54512                          | 10.45488                      | 10.02521                                 | 10.48009               | 40       |
| 21       | 52027                          | 97475                            | <b>54</b> 552                    | 45448                         | 02525                                    | 47973                  | 39       |
| 92<br>23 | <i>5</i> 2063<br><i>5</i> 2099 | 97470<br>97466                   | <b>54</b> 593                    | 45407                         | 02530                                    | 47937                  | 38       |
| 23<br>94 | 52135                          | 97461                            | 54633                            | 45867                         | 02534<br>02599                           | 47901                  | 37       |
| 25       | 52171                          | 97457                            | <b>\$4</b> 673<br><b>\$4</b> 714 | 45327<br>45286                | 02548                                    | 47865<br>47829         | 36<br>35 |
| 26       | 52207                          | 97458                            | 54754                            | 45846                         | 02547                                    | 47793                  | 33       |
| 97       | 52242                          | 97448                            | 54794                            | 45906                         | 02552                                    | 47758                  | 33       |
| 28       | 52278                          | 97444                            | 54835                            | 45165                         | 02556                                    | 47722                  | 32       |
| 29       | <b>52</b> 314                  | <b>974</b> 39                    | 54875                            | 45125                         | 02561                                    | 47686                  | 31       |
| 90       | 9.52850                        | 9- 97435                         | 9.54915                          | 10 . 45085                    | 10.02565                                 | 10 . 47650             | 80       |
| 81       | <b>52</b> 385                  | 97430                            | 54955                            | 45045                         | 02570                                    | 47615                  | 29       |
| 32       | <i>5</i> 2421                  | 97426                            | <b>54</b> 995                    | 45005                         | 02574                                    | 47579                  | 28       |
| 33       | <b>624</b> 56                  | 97421                            | <b>55</b> 085                    | 44965                         | 02579                                    | 47,544                 | 27       |
| 34       | 62492                          | 97417                            | <i>55</i> 07 <i>5</i>            | 44925                         | 09683                                    | 47508                  | 26       |
| 35<br>36 | 52527<br>52527                 | 97412                            | 55115                            | 44685                         | 02588                                    | 47473                  | 25       |
| 37       | <i>526</i> 63<br><i>525</i> 98 | 97408<br>97409                   | 55155                            | 44845                         | 0259 <del>2</del><br>02597               | 47437                  | 24       |
| 38       | 52634                          | 97399                            | 55195<br>55235                   | 44805<br>44765                | <b>02</b> 601                            | 47402<br>47366         | 23       |
| 39       | <i>5</i> 2669                  | 97894                            | 55275                            | 44725                         | 02606                                    | 47831                  | 21       |
| 40       | 9.52705                        | 9.97890                          |                                  | 10 .44685                     | 10.02610                                 | 10 . 47295             | -        |
| 41       | 52740                          | 97385                            | 9.55815<br>55855                 | 44645                         | 02615                                    | 47260                  | 20<br>19 |
| 42       | 52775                          | 97881                            | 55895                            | 4:1605                        | 02619                                    | 47225                  | 18       |
| 43       | 59611                          | 97876                            | 55484                            | 44566                         | 02624                                    | 47189                  | 17       |
| 44       | <i>5</i> 2846                  | 97872                            | 55474                            | 44526                         | 02628                                    | 47154                  | 16       |
| 45       | 52881                          | 97867                            | 55514                            | <b>444</b> 86                 | 02633                                    | 47119                  | 15       |
| 46       | 59916                          | 97863                            | 5555 <del>4</del>                | <b>44</b> .146                | 02637                                    | 47084                  | 14       |
| 47       | <i>5</i> 2951                  | 97958                            | <i>555</i> 93                    | 44407                         | 02642                                    | 47049                  | 13       |
| 48<br>49 | 52986<br>53021                 | 97859                            | <i>55</i> 633                    | 44967                         | 02647                                    | 47014                  | 12       |
|          |                                | 97849                            | <i>55</i> 673                    | 44327                         | 02651                                    | 46979                  | 11       |
| 50       | 9.59056                        | 9.97844                          | 9.55712                          | 10 . 44288                    | 10.02656                                 | 10.46944               | 10       |
| 51<br>80 | <i>5</i> 8092                  | 97840                            | 55752                            | 44248                         | 02660                                    | 46908                  | 9        |
| 52<br>58 | 53126                          | 9783 <i>5</i>                    | 557,91                           | 44209                         | 02665                                    | 46874                  | 8.       |
| 54       | <i>5</i> 3161<br><i>5</i> 3196 | 97331<br>97326                   | <i>55</i> 831<br><i>55</i> 870   | 44169<br>44130                | 02669<br>02674                           | 46839<br>46804         | 7        |
| 55       | 59231                          | 97822<br>97822                   | 55910                            | 44090                         | <b>02678</b>                             | 46769                  | 6.       |
| 56       | 53266                          | 97817                            | 55949                            | 44051                         | 09683                                    | 46734                  | 5 4      |
| 57       | <b>59</b> 501                  | 97812                            | 55989                            | <b>44</b> 011                 | 02688                                    | 46699                  | 3        |
| 58       | - <b>53</b> 336                | 97808                            | 56028                            | 48972                         | 02692                                    | 46664                  | 2        |
| 59       | <b>\$9</b> 370                 | 97808                            | 56067                            | 49933                         | 09697                                    | 46630                  | ī        |
| 60       | <b>594</b> 05                  | <b>9729</b> 9                    | 56107                            | 43893                         | 02701                                    | 46595                  | ō        |
|          | Co-sine.                       | Sine.                            | Co-tangent.                      | Tangent.                      | Co-secant.                               | Secant.                | M.       |
|          |                                |                                  |                                  |                               | L  |                        |          |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

| -                | 1                              |                        | 20 D                           | egrees.          |                        |                        | 7-1      |
|------------------|--------------------------------|------------------------|--------------------------------|------------------|------------------------|------------------------|----------|
| M.               | Sine.                          | Co-sine.               | Tangent.                       | Co-tangent.      | Secant.                | Co-secant.             |          |
| 0                | 9 . 53405                      | 9.97299                | 9.56107                        | 10.43893         | 10.02701               | 10 . 46595             | 60       |
| 1                | 59440                          | 97294                  | 56146                          | 43854            | 02706                  | 46560                  | 59       |
| 2                | 59475                          | 97289                  | 56185                          | 49815            | 02711                  | 46525                  | 58       |
| 3                | 53509                          | 97285                  | 56224                          | 43776            | 02715                  | 46491                  | 57       |
| 4                | 53544                          | 97280                  | <i>5</i> 6264                  | 43736            | 02720                  | 46456                  | 56       |
| 5                | 53578                          | 97276                  | 56903                          | 43697            | 02724                  | 46422                  | 55       |
| 6                | 53613                          | 97271                  | 56342                          | <b>436</b> 58    | 02729                  | 46387                  | 54       |
| 7                | 53647                          | 97266                  | <i>5</i> 6881                  | 43619            | 02734                  | 46353                  | 53       |
| . 8              | 53582                          | 97262                  | 56420                          | 49580            | 02738                  | 46318                  | 52       |
| 9                | 53716                          | 97257                  | 56459                          | 43541            | 02748                  | 46284                  | 51       |
| 10               | 9.53751                        | 9 . 97252              | 9.56498                        | 10 . 43502       | 10 . 02748             | 10.46249               | 50       |
| 11               | 53785                          | 97248,                 | <b>565</b> 37                  | 43463            | 02752                  | 46215                  | 49       |
| 12               | 53819                          | 97243                  | 56576                          | 43424            | 02757                  | 46181                  | 46       |
| 13               | 53854                          | 97238                  | 56615                          | 43385            | 02762                  | 46146                  | 47       |
| 14               | 53888                          | 97234                  | 56654                          | 43346            | 02766                  | 46112                  | 46       |
| 15               | 53922                          | 97229                  | 56693                          | 43507            | 02771                  | 46078                  | 45       |
| - 16             | 59957                          | 97224                  | 56732                          | 43268            | 02776                  | 46043                  | 44       |
| 17               | 59991                          | 97220                  | 56771                          | 43229            | 02780                  | 46009                  | 43       |
| 18               | 54025<br>54059                 | 97215                  | 56810                          | 45190            | 02785                  | 4597 <i>5</i><br>45941 | 49<br>41 |
| 19               | } <u>`</u>                     | 97210                  | 56849                          | 43151            | 02790                  |                        |          |
| 20               | 9 . 54099                      | 9.97206                | 9 . 56887                      | 10.43113         | 10.02794               | 10.45907               | 40       |
| 21               | 54127                          | .97201                 | 56926                          | 49074            | 02799                  | 45873                  | 59       |
| 22               | 54161<br>54105                 | 97196                  | 56965                          | 49035            | 02804                  | 45839<br>45805         | 38<br>37 |
| 29               | 54195                          | 97192                  | 57004                          | 42996            | 02808                  |                        |          |
| 24               | 54229<br>54263                 | 97187                  | 57042                          | 42958            | 02813<br>02818         | 45771<br>45737         | 36<br>35 |
| 25               | 54297                          | 97182                  | 57081                          | 42919            |                        | 45703                  | 34       |
| 26               | <b>54</b> 297<br><b>54</b> 331 | 97178                  | 57120<br>57158                 | 42880<br>42842   | 02822                  | 45669                  | 33       |
| 27<br>28         | 54365                          | 97173<br>97168         | 57158<br>57107                 | 42842<br>42808   | 02827<br>02832         | 45635                  | 32       |
| 28<br>29         | 54399                          | 97168                  | 57197<br>57235                 | 42765            | 02832                  | 45635<br>45601         | 31       |
|                  |                                | <u>'</u>               |                                |                  |                        |                        |          |
| 30               | 9 . 54493<br>54466             | 9.97159                | 9.57274                        | 10.42726         | 10.02841               | 10 . 45567             | 30       |
| 31               |                                | 97154                  | 57812                          | 42688            | 02846                  | 45534<br>45500         | 29<br>28 |
| 52               | 54500<br>54534                 | 97149                  | <i>5</i> 7351<br><i>5</i> 7389 | 42649            | 02851<br>02855         | 45466                  | 28       |
| 55<br>54         | 54567                          | 97145<br><b>9</b> 7140 | 57389<br><b>57428</b>          | 42611<br>42572   | 02860                  | 45493                  | 26       |
| 3 <del>3</del>   | 54601                          | 97135                  | 57466                          | 42534            | 02865                  | 45399                  | 25       |
| 35<br>36         | 5463 <b>5</b>                  | 97130                  | 57504                          | 42496            | 02870                  | 45365                  | 24       |
| 37               | 54668                          | 97126                  | 57543                          | 42457            | 02874                  | 45332                  | 23       |
| 38               | 54702                          | 97121                  | <b>5</b> 7581                  | 42419            | 02879                  | 45296                  | 22       |
| 39               | 54735                          | 97116                  | 57619                          | 42381            | 02884                  | 45265                  | 21       |
| 40               | 9 . 54769                      | 9.97111                | 9.57668                        | 10 . 42349       | 10.02889               | 10.45231               | 20       |
| 41               | 54802                          | 97107                  | 57696                          | 42304            | 02893                  | 45198                  | 19       |
| 42               | 54836                          | 97102                  | 57794                          | 42266            | 02898                  | 45164                  | 18       |
| 43               | <i>5</i> 4869                  | 97097                  | 57772                          | 42228            | 02903                  | <b>4</b> 5131          | 17       |
| 44               | 5490 <b>3</b>                  | 97092                  | <i>5</i> 7810                  | A2190            | 02908                  | 45097                  | 16       |
| 45               | <b>5493</b> 6                  | 97087                  | 57849                          | 42151            | 02913                  | 45064                  | 15       |
| 46               | 54969                          | 97083                  | 57887                          | 42113            | - 02917                | 45031                  | 14       |
| 47               | - <i>55</i> 003                | 97078                  | 57925                          | 42075            | 02922                  | 44997                  | 13       |
| 48               | 55036                          | 97073                  | 57963                          | 49037            | 02927                  | 44964                  | 12       |
| 49               | <i>55</i> 069                  | 97068                  | 58001                          | 41999            | 02982                  | 44931                  | 11       |
| 50               | 9.55102                        | 9 . 97063 •            | 9.58089                        | 10.41901         | 10.02937               | 10.44898               | 10       |
| 51               | 55136                          | 97059                  | 58077                          | 41923            | 02941                  | 44864                  | 9        |
| 52               | 55169                          | 97054                  | 58115                          | 41885            | 02946                  | 44831                  | 8        |
| 53               | 55202                          | 97049                  | 58153                          | 41847            | 02951                  | 44798                  | 7        |
| 54               | 55235                          | 97044<br>07000         | 58191                          | 41809            | 02956                  | 44765                  | 6        |
| 55               | 55268<br>55001                 | 97039                  | 58229                          | 41771            | 02961                  | . 44732                | 5        |
| 56               | 55301<br>##004                 | 97035                  | 58267                          | 41733            | 02965                  | 44699<br>44668         | 4        |
| 57               | 55384                          | 97030                  | 58804<br>5944                  | 41696            | 02970<br>0907 <i>f</i> | 44666<br>44633         | 3        |
| 58               | 55367<br>55400                 | 97025                  | 58342<br>58390                 | 41658            | 02975                  |                        | 2        |
| <i>5</i> 9<br>60 | 55400<br>55433                 | 97020<br>9701 <i>5</i> | 58380<br>58418                 | . 41620<br>41582 | 02980<br>02985         | 44600<br>44567         | á        |
|                  | Co-sine.                       | Sine.                  | Co-tangent.                    |                  | Co-secant.             | Secant.                | M.       |
| 1.               | CO-sine.                       | Dille.                 | Co-tangent.                    | Tangent.         | COGCUMIL               | werent.                | 3744     |

# TABLE XI.

LOGARITHMIC SINES, TANGENTS, AND SECANTS.
21 Degrees.

|          |                                  |                                | 21 ·D                      | egrees.                         |                  |                                |            |
|----------|----------------------------------|--------------------------------|----------------------------|---------------------------------|------------------|--------------------------------|------------|
| M.       | Sine.                            | Co-sine.                       | Tangent.                   | Co-tangent.                     | Secant.          | Co-secant.                     |            |
| 0        | 9.55433                          | 9.97015                        | 9.58418                    | 10.41582                        | 10.02985         | 10.44567                       | 60         |
| 3        | <i>5</i> 5466                    | 97010                          | <b>584</b> 55              | 41545                           | 02990            | 44534                          | 59         |
| 2        | 55499                            | 97005                          | 58493                      | 41507                           | 02995            | 44501                          | 58         |
| 8        | 55532                            | 97001                          | 58531                      | 41469                           | 02999            | 44468                          | 57<br>56   |
| 5        | 55564<br>55597                   | 96996<br>96991                 | 58569<br>5860 <del>0</del> | 41431<br>41394                  | 03004<br>03009   | 44436<br>44403                 | 5 <b>5</b> |
| 6        | 55630                            | . 969 <del>8</del> 6           | 58644                      | 41356                           | 05014            | 44370                          | 54         |
| 7        | <i>55</i> 663                    | 96981                          | 58681                      | 41319                           | 03019            | 44337                          | 53         |
| 8        | . 55695                          | <b>969</b> 76                  | <i>5</i> 8719              | 41281                           | 03024            | 44305                          | 52         |
| 9        | 55728                            | 96971                          | 587 <i>5</i> 7             | 41243                           | 03029            | 44272                          | 51         |
| 10       | 9.53761.                         | 9.96966                        | 9.58794                    | 10.41206                        | 10 . 03034       | 10.44239                       | 5 <b>9</b> |
| 11       | 55798                            | 96962                          | 58832                      | 41168                           | 03038            | 44207                          | 49         |
| 12       | 55826                            | 96957                          | 58869                      | 41131                           | 03043            | 44174                          | 48<br>47   |
| 18<br>14 | . 55858<br>55891                 | 96952<br>96947                 | 58907<br>58944             | 41093<br>41056                  | 03048            | 44142<br>44109                 | 46         |
| 15       | 55928                            | 96942                          | 58981                      | 41019                           | 08058            | 44077                          | 45         |
| 16       | 55956                            | 96937                          | 59019                      | 40981                           | 03063            | 44044                          | 44         |
| 17       | <i>55</i> 988                    | 96982                          | 59056                      | 40944                           | 03068            | 44012                          | 43         |
| 18       | 56021                            | 96927                          | 5909 <del>4</del>          | 40906                           | 03073            | 43979                          | 42         |
| . 19     | <i>5</i> 60 <i>5</i> 3           | 96922                          | 59131                      | 40869                           | 03078            | 43947                          | 41         |
| 90       | 9 . 56085                        | 9.96917                        | 9.59168                    | 10.40832                        | 10.08083         | 10.43915                       | 40         |
| 21       | 56118                            | 96912                          | 59905                      | 40795                           | 03088            | 43882                          | .39        |
| 22<br>23 | 56150                            | 96907                          | <b>5924</b> 3              | 40757                           | 03093            | 43850                          | 38         |
| 24       | 56182<br><b>5</b> 6215           | 96903<br>96898                 | * 59280<br>59317           | 40720<br>40683                  | 03097<br>08102   | 43818<br>4378 <i>5</i>         | 37<br>36   |
| 25       | 56247                            | 96898                          | 59354                      | 40646                           | 03102            | 43753                          | 35         |
| 26       | <i>5</i> 6279                    | 96888                          | 59391                      | 40609                           | 03112            | 43721                          | 34         |
| 27       | 56911                            | 96883                          | 59429                      | 40571                           | 03117            | 43689                          | 23         |
| 28       | 56949                            | 96878                          | 59 <b>4</b> 66             | 40534                           | 03122            | 43657                          | 32         |
| 29       | 56975                            | 96878                          | 59503                      | 40 <del>49</del> 7              | 03127            | 43625                          | 31         |
| 30       | 9.56408                          | 9'. 96868                      | 9 . 59540                  | 10.40460                        | 10.03132         | 10 . 48592                     | 30         |
| 31       | 56440                            | . 9 <b>68</b> 68               | 59577                      | 40423                           | 03187            | 43560                          | 29         |
| 32<br>33 | 56472                            | · 96858                        | 59614                      | 40386                           | 03142            | 43528<br>43496                 | 28<br>27   |
| 94       | 56 <b>5</b> 04<br>565 <b>3</b> 6 | 96863<br>96848                 | 59651<br>59688             | 40349<br>40312                  | . 03147<br>03152 | 43464                          | 26         |
| 35       | <i>565</i> 68                    | 96843                          | 59725                      | 40275                           | 03157            | 43432                          | 25         |
| 36       | 56599                            | 96888                          | 59762                      | 40288                           | 03162            | 49401                          | 24         |
| 37       | <b>566</b> 81                    | 96883                          | 59799                      | 40201                           | 05167            | 43369                          | 23         |
| 38<br>39 | 56668                            | 96828                          | 59835                      | 40165                           | 03172            | 43837                          | 22         |
|          | 56695                            | <b>9682</b> 3                  | . 59872                    | 40128                           | 03177            | 43305                          | 21         |
| 40       | 9.56727                          | 9.96818                        | 9.59909                    | 10.40091                        | 10.03182         | 10 . 43273                     | 20         |
| 42       | 56759                            | 96813                          | 59946<br>50089             | 40054                           | 08187            | 43241                          | 19         |
| 43       | 56790<br>56822                   | 96808<br>96803                 | 59983<br>60019             | 40017<br>39 <b>9</b> 81         | 03192<br>03197   | 43210<br>43178                 | 18<br>17   |
| 44       | 56854                            | 96798                          | 60056                      | 39944                           | 03202            | 43146                          | 16         |
| 45       | 56886                            | 96793                          | 60093                      | 39907                           | 03907            | 49114                          | 15         |
| 46       | 56 <b>9</b> 17                   | 96788                          | 60130                      | <b>\$</b> 9870                  | 03212            | 49083                          | 14         |
| 47       | 56949                            | 96783                          | 60166                      | 39834                           | 03217            | 43051                          | 13         |
| 48<br>49 | 56980<br>57012                   | 96778<br>96772                 | 6020 <b>\$</b><br>. 60240  | 39797<br>39760                  | 03222<br>03228   | 43020<br>42988                 | 12<br>11   |
|          |                                  |                                |                            |                                 |                  |                                |            |
| 50<br>51 | 9.57044                          | 9.96767                        | 9.60276                    | 10 . 39724                      | 10.03233         | 10 . 42956                     | 10         |
| 51<br>52 | 57075<br>57107                   | 96762<br>96757                 | 60813                      | 39687<br>39651                  | 03238<br>03243   | 42925<br>42893                 | 9          |
| 53       | <i>5</i> 7107<br><i>5</i> 7138   | <b>96757</b><br>9 <b>67</b> 52 | 60349<br>60376             | 39614                           | 03248            | 42862                          | 7          |
| 54       | <i>5</i> 7169                    | 96747                          | 60422                      | 39578                           | 03253            | 42831                          | 6          |
| 55       | <i>5</i> 7201                    | 96742                          | 60459                      | 39541                           | 03258            | 42791                          | 5          |
| 56       | 57232                            | 96787                          | 60495                      | 39505                           | 03263            | 42768                          | 4          |
| 57       | <i>5</i> 7964                    | 96792                          | 60532                      | 39468                           | 03268            | 42736                          | 3          |
| 58<br>59 | 57295                            | 96727                          | 60568                      | 39482                           | 03273            | 42705                          | 2          |
| 59<br>60 | 57326<br>57358                   | 96722<br>96717                 | 6060 <i>5</i><br>60641     | 3939 <i>5</i><br>393 <i>5</i> 9 | 03278<br>03283   | <b>4</b> 2674<br><b>4</b> 2642 | 1          |
| —        | <del></del>                      |                                |                            |                                 |                  | <del></del>                    |            |
| 1        | Co-signe.                        | Sine.                          | Co-tangent.                | Tangent.                        | Co-secant.       | Secant                         | M.         |

|                      |                                 |                         |   |                                |                                  | -                                |            |
|----------------------|---------------------------------|-------------------------|---|--------------------------------|----------------------------------|----------------------------------|------------|
| 56                   |                                 | 00402742                |   | LE XI.                         | NT CEALS                         | re                               |            |
|                      | <u> </u>                        | OGARITHM                | IC SINES, TA                            | angents, A                     | IND SECAN                        | 1.2.                             | ∦          |
| M.                   | Sine.                           | Co-sine.                | Tangent.                                | Co-tangent.                    | Secant.                          | Co-secant.                       | H          |
| 0                    | 9.57358                         | 9.96717                 | 9 . 60641                               | 10 . 89859                     | 10.03283                         | 10 . 42642                       | 60         |
| 1                    | 57889                           | 96711                   | 60677                                   | 39323                          | 03289                            | 42611                            | 59<br>58   |
| 2 3                  | <i>5</i> 7420<br><i>5</i> 7451  | 96706<br>96701          | <b>6</b> 0714<br><b>6</b> 07 <i>5</i> 0 | 39 <del>2</del> 86<br>39250    | 03 <b>294</b><br>-03299          | 42580<br>42549                   | 57         |
| 4                    | 57482                           | 96696                   | 60786                                   | 39214                          | 03304                            | 42518                            | 56         |
| 5                    | 57514                           | 96691                   | 60823                                   | 89177                          | 03309                            | 42486                            | 55         |
| 6<br>7               | 57545                           | 96686<br>96681          | 60859                                   | 39141                          | 03514                            | 42455<br>42424                   | 54<br>53   |
| 8                    | 57576<br>57607                  | 96676                   | 6089 <i>3</i><br>60931                  | 39105<br>39069                 | 03319<br>03324                   | 42393                            | 52<br>52   |
| 9                    | 57638                           | 96670                   | 60967                                   | 89033                          | <b>099</b> 30                    | 42362                            | 51         |
| 10                   | 9.57669                         | 9.96665                 | 9.61004                                 | 10.38996                       | 10.09935                         | 10 . 42331                       | <i>5</i> 0 |
| 11<br>12             | 57700<br>57731                  | 96660<br>96655          | 61040<br>61076                          | 38960<br>88924                 | <b>0394</b> 0<br><b>033</b> 45   | 42300<br>42269                   | 49<br>48   |
| 18                   | 57762                           | 96650                   | 61112                                   | 38888                          | 03950                            | 42238                            | 47         |
| <b>114</b> .         | 57793                           | 96645                   | 61148                                   | · 98852                        | <b>03</b> 855                    | 42207                            | 46         |
| 15                   | 57824                           | 96640                   | 61184                                   | 58816                          | 08860                            | 42176                            | 45         |
| 16<br>17             | 57854<br>57885                  | 96634<br>96 <b>62</b> 9 | 61220<br>61256                          | 38780<br>38744                 | 08366<br>03371                   | 42146<br>42115                   | 44<br>43   |
| 18                   | 57916                           | 96624                   | 61292                                   | 38708                          | 03376                            | 42084                            | 42         |
| 19                   | 57947                           | <b>9</b> 6619           | 61928                                   | 38672                          | 03981                            | 42053                            | 41         |
| 20                   | 9.57978                         | 9.96614                 | 9.61864                                 | 10.38636                       | 10 . 03386                       | 10.42022                         | 40         |
| 21<br>22             | 58008<br>58039                  | 96608<br>96603          | 61400<br>61486                          | \$8600<br>\$8564               | <b>633</b> 92<br><b>633</b> 97   | 41 <b>9</b> 92<br>41961          | 39<br>38   |
| 28                   | 58070                           | 96 <i>5</i> 98          | 61472                                   | <b>385</b> 28                  | 03402                            | 41930                            | 37         |
| 24                   | <i>5</i> 8101                   | 96593                   | 61508                                   | <b>384</b> 02                  | 03407                            | 41899                            | 36         |
| 25                   | 58191                           | 96588                   | 61544                                   | <b>984</b> 56                  | 03412                            | 41869                            | 35<br>34   |
| 26<br>27             | 58162<br>58192                  | 96582<br>96577          | 61579<br>61615                          | 38421<br>38385                 | 03418<br>03423                   | 41838<br>41808                   | 33         |
| 28                   | 58223                           | 96572                   | 61651                                   | <b>3</b> 8349                  | 03428                            | 41777                            | 32         |
| 29                   | <b>582</b> 53                   | 96567                   | 61 <b>6</b> 87                          | <b>88</b> 313                  | 03433                            | 41747                            | 31         |
| 30                   | 9.58284                         | 9.96562                 | 9.61722                                 | 10.38278                       | 10.03438                         | 10.41716                         | 30         |
| 31                   | 58314                           | 96556                   | 61758                                   | 38242<br>38206                 | 03444<br>. 08449                 | 41 <b>6</b> 86<br>41 <b>6</b> 55 | 29<br>28   |
| 32<br>39             | 58345<br>53375                  | 96551<br>96546          | 61794<br>61850                          | 38170                          | 03464                            | 41 <b>6</b> 25                   | 27         |
| 94                   | 58496                           | 96541                   | £1865                                   | 88135                          | <b>034</b> 59                    | 41594                            | 26         |
| 35                   | <i>5</i> 8436                   | 96 <b>5</b> 85          | 61901                                   | 38099                          | 03465                            | 41564                            | 25         |
| 36                   | 58467                           | 96580                   | 61936                                   | 38064                          | . 03470<br>03475                 | 41 <i>5</i> 53<br>41 <i>5</i> 03 | 24<br>23   |
| 97<br>38             | 58 <b>4</b> 97<br><b>5</b> 8527 | 96525<br>96520          | 61972<br>62008                          | 38028<br>37992                 | 03460                            | 41473                            | 22         |
| 39                   | <b>58</b> 557                   | 96514                   | 62043                                   | 37957                          | 03486                            | <b>4</b> 1443                    | 21         |
| 40                   | 9.58588                         | 9 . 96500               | 9.62079                                 | 10.37921                       | 10.03491                         | 10.41412                         | 20         |
| 41                   | 58618                           | 96504                   | 62114                                   | 37886                          | 03496                            | 41382<br>41352                   | 19         |
| 42<br>48             | 58648<br>58678                  | 96498<br>96493          | 62150<br>62185                          | 37850<br>37815                 | 03502<br>03 <i>5</i> 07          | 41322                            | 18         |
| 44                   | 58709                           | 96488                   | · 62221                                 | <b>5</b> 7779                  | 03512                            | 41291                            | 16         |
| 45                   | <i>5</i> 8739                   | 96463                   | 62256                                   | <b>3</b> 7744                  | 03517                            | 41261                            | 15,        |
| 46                   | 58769                           | 96477                   | 62292                                   | 97708                          | 03523                            | 41281<br>41201                   | 14         |
| 47<br>48             | 58799<br>58829                  | 96472<br>96467          | 62327<br>62362                          | 37673<br>37638                 | 03 <i>5</i> 28<br>03 <i>5</i> 33 | 41171                            | 13         |
| 49                   | 58859                           | 96461                   | 62598                                   | 37602                          | <b>035</b> 39                    | 41141                            | l ii       |
| <i>5</i> 0           | 9.58889                         | 9 . 96456               | 9 . 62433                               | 10 . 37567                     | 10.03544                         | 10.41111                         | 10         |
| 51                   | <b>5</b> 8919                   | 96451                   | 62468                                   | 97 <i>5</i> 92                 | 03549                            | 41061                            | 9          |
| 52<br>58             | 58949<br>58 <b>9</b> 79         | 96445<br>96440          | <b>625</b> 04<br><b>625</b> 89          | <b>3749</b> 6<br><b>374</b> 61 | 03 <i>5</i> 55<br>03 <i>5</i> 60 | 41051<br>41021                   | 8 7        |
| 54                   | 59009                           | 96485                   | 62574                                   | 37426                          | 03565                            | 40991                            | 6          |
| <b>5</b> 5           | <b>59</b> 039                   | <b>9642</b> 9           | 62609                                   | 37991                          | 05571                            | 40961                            | 5          |
| 56                   | 59069                           | 96424                   | 62645                                   | <b>87965</b>                   | 03 <i>5</i> 76                   | 40931                            | 4          |
| 57<br>58             | 59098<br>59128                  | 96419<br>96413          | <b>6268</b> 0<br><b>627</b> 1 <i>5</i>  | 37390<br>37285                 | 03.581<br>03.587                 | 40902<br>40872                   | 3 2        |
| 57<br>58<br>59<br>60 | 59158                           | 96408                   | 62750                                   | 37263<br>37260                 | 03592                            | 40842                            | li         |
| 60                   | 59188                           | 96403                   | 62785                                   | 37215                          | 03597                            | 40812                            | 0          |
|                      | Co-sine.                        | Sine.                   | Co-tangent.                             | Tangent.                       | Co-secant.                       | Secant.                          | JM.        |

|            |                                    |                        |                               | E XI.                    |                                |                                  | <i>5</i> 7           |
|------------|------------------------------------|------------------------|-------------------------------|--------------------------|--------------------------------|----------------------------------|----------------------|
|            |                                    | LOGARITHM              |                               | egrees.                  | AND SECAN                      | rş.                              | ······· <sup>!</sup> |
| M.         | · Sine.                            | Co-sine.               | Tangent.                      | Co-tangent.              | Secant.                        | Co-secant.                       |                      |
| 0          | 9 . 59188                          | 9.96403                | 9 . 62785                     | 10.87215                 | 10 . 03597                     | 10.40812                         | 60                   |
| 1 2        | <i>5</i> 9218<br><i>5</i> 9247     | 96397′<br>96392        | 62820<br>628 <i>55</i>        | 37180<br>37145           | 0360 <b>3</b><br>0360 <b>8</b> | 40782<br>40753                   | 59<br>58             |
| 3          | 59277                              | 96987                  | 62890                         | · 37110                  | 03613                          | 40723                            | 57                   |
| 4          | 59307                              | 96381                  | 62926                         | 87074                    | 03619                          | 40693                            | 56                   |
| 5          | <i>5</i> 9336                      | 96376                  | 62961                         | <b>37</b> 03 <b>9</b>    | 03694                          | 40664                            | 55                   |
| 6          | <i>5</i> 936 <b>6</b>              | 96370                  | 62996                         | 37004 <sup>′</sup>       | 03630                          | 40634                            | 54                   |
| 7          | <i>5</i> 9 <b>3</b> 96             | 96365                  | 63931                         | 3696 <b>9</b>            | 03635                          | 40604                            | 58<br>52             |
| 9          | 59 <b>4</b> 25<br>59 <b>4</b> 55   | 96360<br>96354         | 63066<br>63101                | 3693 <b>4</b><br>36899   | 03640<br>03646                 | 40575<br>40545                   | 52<br>51             |
| 10         |                                    |                        |                               |                          |                                |                                  | 50                   |
| 11         | 9.59484<br>59514                   | 9 • 96349<br>96343     | 9. G3135<br>63170             | 10.36865<br>36830        | 10 . 03651<br>03657            | 10 . 40516<br>40486              | 49                   |
| 12         | <b>5954</b> 3                      | 96338                  | 63205                         | 36795                    | 03662                          | 40457                            | 48                   |
| 13         | . 59573                            | 96333                  | 63240                         | 36760                    | 03667                          | 40427                            | 47                   |
| 14         | <i>5</i> 9602                      | 96327                  | <b>6</b> 327 <b>5</b>         | <b>3</b> 6725            | 03673                          | 40398                            | 46                   |
| 15         | 5863 <b>2</b>                      | 96322                  | 63310                         | 36690                    | 03678                          | 40368                            | 45                   |
| 16<br>17   | 59661                              | 96316                  | 69345                         | \$6655<br>86601          | 03684                          | 40339                            | 44<br>49             |
| 18         | <i>5</i> 9690<br><i>5</i> 97≌0     | 96311<br>9630 <i>5</i> | 63379<br>63414                | 36621<br>36586           | <b>0</b> 3689<br>0869 <i>5</i> | 40480<br>40480                   | 49                   |
| 19         | 59749                              | 96300                  | <b>6</b> 8 <b>4</b> 49        | 26551                    | 03700                          | 40251                            | 41                   |
| 20         | 9.59778                            | 9.96294                | 9.63484                       | 10.36516                 | 10.03706                       | 10.40222                         | 40                   |
| 21         | 59808                              | 96289                  | 63519                         | 36481                    | 03711                          | 40192                            | 39                   |
| 22         | <i>5</i> 9837                      | 96284                  | <b>6</b> 8553                 | 36447                    | 03716                          | 40163                            | 38                   |
| 23         | <i>5</i> 9866                      | 96278                  | 63588                         | 36412                    | 03722                          | 40134                            | 37                   |
| 24         | <i>5</i> 989 <i>5</i>              | 96273                  | 68623                         | 36377                    | 03727                          | 40105                            | 36                   |
| 25<br>26   | 59924                              | 96267                  | 63657                         | 36343                    | 03733                          | 40076                            | 35                   |
| 20         | 59954<br>59983                     | 96262<br>96256         | 63692<br>63726                | \$6308<br>\$627 <b>4</b> | 03738,<br><b>0</b> 3744        | 40046<br>40017                   | 34<br>83             |
| . 28       | 60012                              | 96251                  | 63761                         | 36239                    | 03749                          | 39988                            | 32                   |
| 29         | 60041                              | 96245                  | 63796                         | 36204                    | <sup>1</sup> 03755             | 399 <b>59</b>                    | 31                   |
| 30         | 9.60070                            | 9.96240                | 9 . 63830                     | 10.36170                 | 10.03760                       | 10.89930                         | 30                   |
| 31         | 60099                              | 96234                  | 63865                         | <b>361</b> 35            | 03766                          | 39901                            | 29                   |
| 32         | 60128                              | 96229                  | 63899                         | 36101                    | 03771                          | 39872                            | 28                   |
| 38<br>34   | 60157                              | 96223                  | 63934                         | 36066                    | 03777                          | 39843                            | 27<br>26             |
| 35         | 60186<br><b>6</b> 021 <i>5</i>     | 96218<br>96212         | 63968<br>64003                | 36032<br>35997           | 03782<br>03788                 | 39814<br>39785                   | 25                   |
| 36         | 6)244                              | 96207                  | 64097                         | 35963                    | 03793                          | 39756                            | 24                   |
| 37         | 60273                              | 96201                  | 64072                         | 35928                    | 03799                          | 39727                            | 23                   |
| 38         | 60302                              | 96196                  | 64106                         | . 35894                  | 03804                          | 39698                            | 22                   |
| 39         | 60331                              | 96190                  | 64140                         | 85860                    | 03810                          | 59669                            | 21                   |
| 40         | 9.60359                            | 9.96185                | 9.64175                       | 10.35825                 | 10.03815                       | 10.39641                         | 20                   |
| 41         | 60388                              | 96179                  | 64209                         | 35791                    | 03821                          | 99612                            | 19                   |
| 42         | 60417<br>60446                     | 96174<br>96168         | 642 <b>4</b> 9<br>64278       | 35757<br>35722           | 03826<br>03832                 | 39583<br>39554                   | 18<br>17             |
| 44         | 60474                              | 96162                  | 64312                         | 35688                    | 03838                          | 39526                            | 16                   |
| 45         | 60503                              | 96157                  | 64346                         | 35654                    | 08849                          | 39497                            | 15                   |
| 46         | 60532                              | 96151                  | 64381                         | 95619                    | 03849                          | 39468                            | 14                   |
| 47         | 60561                              | 96146                  | 64415                         | 35585                    | 03854                          | 39439                            | 13                   |
| 48         | 60589                              | 96140                  | 64449<br>6449                 | 95551<br>95517           | 03860                          | 39411                            | 12                   |
| 49         | 60818                              | 96135                  | 64483                         | 35517                    | 03865                          | 39382                            |                      |
| 50<br>51   | 9.60646                            | 9.96129                | 9.64517                       | 10 . 95483<br>35448      | 10.03871                       | 10.39354                         | 10                   |
| 52         | 6067 <i>5</i><br>6070 <del>4</del> | 96123<br>96118         | 64552<br>64586                | 35448<br>35414           | 03877<br>03882                 | 39325<br>39296                   | 9                    |
| <i>5</i> 3 | 60732                              | 96112                  | 64620                         | <b>35</b> 980            | 03888                          | 39268                            | 7                    |
| 54         | 60761                              | 96107                  | 64654                         | <b>35</b> 3 <b>46</b>    | 03893                          | 39239                            | 6                    |
| 55         | 60789                              | 96101                  | 64688                         | 95312                    | 03899                          | 39211                            | 5                    |
| 56         | 60818                              | 96095                  | 64722                         | 95278                    | 03905                          | 89182                            | 4                    |
| 57<br>58   | 60846<br>6087 <i>5</i>             | 96090<br>96084         | <b>64756</b><br><b>6479</b> 0 | 95244<br>95210           | 03910<br>03916                 | 391 <i>5</i> 4<br>391 <b>2</b> 5 | 8                    |
| 59         | 60903                              | 96079                  | 64824                         | 35176                    | 03921                          | 39097                            | ī.                   |
| 60         | 60931                              | 96073                  | 64858                         | 95142                    | 03927                          | 83069                            | o '                  |
|            | Co-sine.                           | Sine.                  | Co-tangent.                   | Tangent.                 | Co-secant.                     | Secant.                          | M.                   |
| '          | An ime                             |                        |                               | 1                        | 1                              |                                  |                      |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|            |                         |                | 24 De                 | grees.                |                |                   | $\top$   |
|------------|-------------------------|----------------|-----------------------|-----------------------|----------------|-------------------|----------|
| M.         | Sine.                   | Co-sine.       | Tangent.              | Co-tangent.           | Secant.        | Co-secant.        |          |
| 0          | 9.60931                 | 9.96073        | 9.64858               | 10.35142              | 10.03927       | 10.39069          | 60       |
| 1          | 60960                   | 96067          | 64892                 | 35108                 | 03933          | 39040             | 59       |
| 2          | 60988                   | 96062          | 64926                 | 35074                 | 03938          | 89012             | 58       |
| 3          | 61016                   | 960.56         | 64960 .               | 35040                 | 03944          | 38984             | 57       |
| 4          | 61045                   | 96050          | 64994                 | 35006                 | 03950          | 38955             | 56       |
| 5          | 61073                   | 96045          | 65028                 | 34972                 | 03955          | 38927             | 55       |
| 6          | 61101                   | 96039          | 65062                 | 54938                 | 03961          | 38899             | 54       |
| 7          | 61129                   | 96034          | 65096                 | 3 <b>49</b> 04        | 03966          | 38871             | 53       |
| 8          | 61158                   | 96028          | 65130                 | 34870                 | 03972          | 38842             | 52       |
| 9          | 61186                   | 96022          | 65164                 | S4836                 | . 03978        | 88814             | 51       |
| 10         | 9.61214                 | 9.96017        | 9.65197               | 10.34803              | 10.03983       | 10.88786          | 50       |
| 11         | 61242                   | 96011          | 65231                 | 34760                 | 03989          | 38758             | 49       |
| 12         | 61270                   | 96005          | 65265                 | <b>347</b> 35         | 03995          | 88730             | 48       |
| 13         | 61298                   | 96000          | 65299                 | 34701                 | 04000          | 38702             | 47       |
| 14         | 61326                   | 95994          | 65333                 | 34667                 | 04006          | 38674             | 46       |
| 15         | 61354                   | 9,7948         | 65366                 | 34634                 | 04012          | 38646             | 45       |
| 16         | 61382                   | <b>95</b> 982  | 65400                 | 34600                 | 04018          | 38618             | 44       |
| 17         | 61411                   | 95977          | 65494                 | 84563                 | 04023          | 38589             | 43       |
| 18         | 61438                   | 95971          | 65467                 | 84533                 | 04029          | 38562             | 42       |
| 19         | 61466                   | 95965          | 65501                 | 34499                 | 04035          | 38534             | 41       |
| 20         | 9.61494                 | 9.95960        | 9.65535               | 10.34465              | 10.04040       | 10.38506          | 40       |
| 21         | 61522                   | 95954          | 65 <b>5</b> 68        | 34432                 | 04046          | 38478             | 39       |
| 22         | 61550                   | 95948          | 65602                 | 34398                 | 04052          | 38450             | 38       |
| 23         | 61578                   | 95942          | 65636                 | 34364                 | 04058          | 38422             | 37       |
| 24         | 61606                   | 95937          | 65669                 | 34331                 | 04063          | 38394             | 36       |
| 25         | 61634                   | 95931          | 65703                 | 34297                 | 04069          | 38366             | 35       |
| 26         | 61662                   | 95925          | 65736                 | 34264                 | 04075          | 38338             | . 34     |
| 27         | 61689                   | 95920          | 65770                 | 34230                 | 04080          | 38311<br>38283    | 33       |
| 28         | 61717                   | 95914          | 65803                 | 34197                 | 04086<br>04092 | 38255             | 31       |
| 29         | 61745                   | 95938          | 65837                 | 34163                 |                |                   |          |
| 30         | 9.61773                 | 9.95902        | 9:65870               | ru . 34130            | 10.04098       | 10.38227          | 30       |
| 31         | 61800                   | 95897          | 65904                 | 34096                 | 04103          | 38200             | 29       |
| 32         | 61828                   | 95891          | , 65937               | 34063                 | 04109          | 38172<br>38144    | 28<br>27 |
| 33         | 61856                   | 95885          | 65971                 | 34029                 | 04115          | 38117             | 26       |
| 34         | 67883                   | 95879          | 66004                 | 53 <b>9</b> 96        | 04121          | 33089             | 25       |
| 35         | 61911                   | 95873          | / 66038               | 33962                 | 01127<br>04132 | 38061             | 24       |
| 36<br>37   | 61939<br>61 <b>9</b> 66 | 95868<br>95862 | 66071 66104           | 33929<br>33896        | 04138          | 38034             | 23       |
| 38         | 61994                   | 95856          | 66138                 | 33862                 | 04144          | 38006             | 22       |
| 39         | 62021                   | 95850          | 66171                 | 33829                 | 04150          | 37979             | 21       |
| 40         | 9.62019                 | 9.95944        | 9.66201               | 10.33796              | 10.04156       | 10.37951          | 20       |
| 41         | 62076                   | 93839          | 66238                 | 33762                 | 04161          | 3792 <del>4</del> | 19       |
| 42         | 62104                   | 95833          | 66271                 | 33729                 | 04167          | 37896             | 18       |
| 43         | <b>69</b> 131           | 95827          | <b>66</b> 30 <b>4</b> | 33696                 | 04173          | 37869             | 17       |
| 44         | 62159                   | 95821          | 66337                 | 33663                 | 04179          | 37841             | 16       |
| 45         | 62186                   | 95815          | 66371                 | 33629                 | 04185          | 37814             | 15       |
| 46         | 62214                   | 95810          | 66404                 | <b>33596</b>          | 04190          | 37786             | 14       |
| 47         | 62241                   | 95804          | 66437                 | 33563                 | 04196          | 37759             | 13       |
| 48         | 62268                   | 95798          | 66470                 | 33530                 | 04202          | 37732             | 12       |
| 49         | -62296                  | 95702          | 66503                 | 33497                 | 04208          | 37704             | 11       |
| <b>5</b> 0 | 9 . 62323               | 9.95786        | 9.66537               | 10 . 83463            | 10.04214       | 10.37677          | 10       |
| 51         | 62350                   | 95780          | 66570.                | 33430                 | 04220          | 37650             | 9        |
| 52         | 62577                   | 95775          | 66603                 | 33397                 | 04925          | 37623             | 8        |
| 53         | 62405                   | 95769          | 66636                 | 33364                 | 04231          | 37595             | 7        |
| 54         | 69432                   | 95763          | 66669                 | 83831                 | 04237          | 37568             | 6        |
| 55         | 62459                   | 95757          | 66702                 | 33298                 | 04243          | 37541             | 5        |
| 56         | 62486                   | 95751          | 66735                 | 93265                 | 04249          | 37514             | 3        |
| 57         | 62513                   | 957 <b>4</b> 5 | 66768<br>66901        | 33232                 | 04255          | 37487             | 2        |
| 58<br>59   | 62541<br><b>6</b> 2568  | 95739<br>96733 | 66801<br>66334        | 33199<br><b>33166</b> | 04261<br>04267 | 37459<br>37432    | ī        |
| <b>6</b> 0 | 62595                   | 95728          | 66867                 | 38183                 | 04272          | 97405             | ō        |
|            | Co-sine.                | Sine.          | Co-tangent.           | Tangent.              | Co-secant.     | Secant.           | M.       |
| 1          | ,                       | ·              |                       | errees.               |                | L                 | 1        |
|            |                         |                |                       |                       |                |                   |          |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

| 1   | 1             |                | 25 D        | egrees.     |               |                       | 1        |
|-----|---------------|----------------|-------------|-------------|---------------|-----------------------|----------|
| M.  | Sine.         | Co-sine.       | Tangent.    | Co-tangent. | Secant.       | Co-secant.            |          |
| 0   | 9 . 62595     | 9.95728        | 9.66867     | 10.33133    | 10.04272      | 10 . 37405            | 60       |
| 1   | 62622         | 95722          | 66900       | 33100       | C4273         | 37378                 |          |
| 2   | 62649         | 95716          | 66933       | 33067       | 04284         | 37351                 | ₹9<br>38 |
| 8   | 62676         | 95710          | 66966       | 33034       | 04290         | 37324                 | 57       |
| 4   | 62703         | 95704          | •           | 33001       | 04296         | 37297                 | 56       |
|     |               |                | 66999       | 1           |               | 1                     |          |
| 5   | 62730         | 95698          | 67032       | 32968       | 04302         | 37270                 | 55       |
| 6   | 62757         | 95692          | 67065       | 32935       | 04308         | 37243                 | 54       |
| 7   | 62784         | ,95686         | 67098       | 32902       | 04314         | 87216                 | 53       |
| 8   | 62811         | 95680          | 67131       | 32369       | 04320         | 37189                 | 52       |
| 9   | 62838         | 95674          | 67163       | 32887       | 04326         | <b>3716</b> 2         | 51       |
| 10  | 9.62865       | 9.95668        | 9.67196     | 10.32804    | 10.04332      | 10.37135              | ن0       |
| 11  | 62892         | 95663          | 67229       | 32771       | 01387         | 37108                 | 49       |
| 12  | 62918         | 95657          | 67262       | 32738       | 04343         | 37082                 | 48       |
| 13  | 62945         | 95651          | 67295       | 32705       | 04349         | 37055                 | 47       |
| 14  | 62972         | 95645          | 67327       | 32673       | 04355         | <b>3</b> 7028         | 46       |
| 15  |               |                |             | 1           |               |                       |          |
|     | 62999         | 95689          | 67360       | 32640       | 04361         | 37001                 | 45       |
| 16  | 63026         | 95683          | 67393       | 82607       | 04367         | 36974                 | 44       |
| 17  | 63052         | 95627          | 67426       | 32574       | 04373         | 36948                 | 43       |
| 18  | <b>6</b> 3079 | 95621          | 67458       | 32542       | 04379         | 36921                 | 42       |
| 19  | 63106         | 95615          | 67491       | 82509       | 0438 <i>5</i> | 36894                 | 41       |
| 20  | 9 . 63133     | 9.95609        | 9.67524     | 10.32476    | 10.04391      | 10.36867              | 40       |
| 21  | 63159         | 95603          | 67556       | 32444       | 04397         | 36841                 | 39       |
| 22  | 63186         | <b>955</b> 97  | 67589       | 32411       | 01403         | 36814                 | 38       |
| 23  | 63213         | 95591          | 67622       | 32378       | 04109         | 36787                 | 37       |
| 24  | 63239         | 95585          | 67654       | 32346       | 04415         | 36761                 | 36       |
| 25  | 63266         | 95579          | 67687       | 32313       | 04421         | 36734                 | 85       |
| 26  | 63292         | 95573          | 67719       | 32281       | 04427         | 36708                 | 34       |
| 27  | 63319         |                |             | 32248       | 04433         | 36681                 | 33       |
|     |               | 95567          | 87752       |             |               |                       |          |
| 28  | 63345         | 95561          | 67785       | 32215       | 04439         | 366 <b>5</b> 5        | 32       |
| 29  | 63372         | 95355          | 67817       | 32183       | 04445         | 36628                 | 31       |
| 30  | 9.63398       | 9.95549        | 9.67850     | 10.32150    | 10.04451      | 10.36602              | 30       |
| 31  | 63425         | 95543          | 67882       | 32118       | 04457         | 36575                 | 29       |
| 32  | 63451         | 95537          | 67915       | 32085       | 04463         | 36549                 | 28       |
| 33  | 63478         | 95531          | 67947       | 32053       | 04469         | 36522                 | 27       |
| 34  | 63504         | 95525          | 67980       | 32020       | 04475         | 36496                 | 26       |
| 35  | 63531         | 95519          | 68012       | 31988       | 04481         | 36469                 | 25       |
| 36  | 63557         | 95513          | 63044       | 31956       | 04487         | 36443                 | 24       |
| 37  | 63583         | 95507          | 68077       | 31923       | 04493         | 36417                 | 23       |
| 378 | 63610         | 95500          | 68109       | 31891       | 04500         | 36390                 | 22       |
| 39  | 63636         | 95494          | 68142       | 31858       | 04506         | 36364                 | 21       |
| 40  | 9 . 68662     | 9.95438        | 9.68174     | 10.31826    | 10.04512      | 10.36398              | 20       |
| 41  | 63689         | 95482          | 68206       | 31794       | 04518         | 36311                 | 19       |
| 42  | 63715         | 95476          | 68239       | 31761       | 04524         | 36285                 | 18       |
| 43  | 63741         | 95470<br>95470 |             |             | 04530         | 36259                 | 17       |
|     |               |                | 68271       | 31729       |               |                       |          |
| 44  | 68767         | 95464          | 68308       | 31697       | 04536         | 36283                 | 16       |
| 45  | 63794         | 95458          | 68336       | 31664       | 04542         | 36206                 | 15       |
| _46 | 68320         | 95452          | 68368       | 31632       | 04548         | 36180                 | 14       |
| 47  | 63846         | 95446          | 68400       | 31600       | 04554         | <b>3</b> 615 <b>4</b> | 13       |
| 48  | 63872         | 95440          | 68432       | 31568       | 04560         | 36128                 | 12       |
| 49  | <b>68</b> 898 | <b>954</b> 34  | 68465       | 31535       | 04566         | 36102                 | 11       |
| 50  | 9 . 63924     | 9.95427        | 9.68497     | 10.31503    | 10.04573      | 10.36076              | 10       |
| 51  | 63950         | 95421          | 68529       | 31471       | 04579         | 36050                 | 9        |
| 52  | 63976         | 95·11.5        | 68561       | 31439       | 04585         | \$6024                | 8        |
| 53  | 64002         | 95109          | 68593       | 31407       | 04591         | 35998                 | 7        |
| 54  | 64028         | 95403          | 68626       | 31374       | 04597         | 35972                 | 6        |
| 55  | 64054         | · 95397        | 63658       | 31342       | 04603         | 35946                 | 5        |
| 56  | 64080         | 95391          | 68690       | 31310       | 04609         | 35920                 | 4        |
| 57  | 64106         |                |             |             |               |                       |          |
|     |               | 95384          | 68722       | 31278       | 04616         | 3589 <del>4</del>     | 3        |
| 58  | 64132         | 95378          | 68754       | 31246       | 04522         | 358 <b>68</b>         | 2        |
| 59  | 64158         | 95372          | 68786       | 21214       | 04628         | 35842                 | 1        |
| 60  | 64184         | 95366          | 68818       | 31182       | 04634         | 35816                 | 0        |
|     | Co-sine.      | Sine.          | Co-tangent. | Tangent.    | Co-secant.    | Secant.               | M.       |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

| 7        | 26 Degrees.            |                        |                        |                       |                  |                     |          |  |
|----------|------------------------|------------------------|------------------------|-----------------------|------------------|---------------------|----------|--|
| M.       | Sine.                  | Co-Sine.               | Tangent.               | Co-tangent.           | Secant.          | Co-secant.          |          |  |
| 0        | 9.64184                | 9.95366                | 9.68818                | 10.31182              | 10.04634         | 10.35816            | 60       |  |
| I 🙀      | 64210                  | 95360                  | 64850                  | 31150                 | 04640            | 35790               | 59       |  |
| 2        | . 64236                | 95354                  | 68882                  | 31118                 | 04646            | 35764               | 58       |  |
| 3        | 64262                  | 95348                  | 68914                  | 31086                 | 04652            | 35738<br>35712      | 57       |  |
| 5        | 64288<br>64313         | 95341<br>95355         | 68946<br>69079         | 31054                 | 04659<br>• 04665 | 35687               | 56<br>55 |  |
| 6        | 64339                  | 95329                  | <b>6</b> 8978<br>69∋10 | 31022<br>30990        | 04671            | 35661               | 54       |  |
| 7        | 64365                  | 95523                  | .69012                 | 30958                 | 04677            | 35635               | 58       |  |
| 8        | 64391                  | 95317                  | 69074                  | 30926                 | 04683            | 35609               | 52       |  |
| 9        | 64417                  | 95310                  | 69106                  | 80394                 | 04690            | 3 <i>55</i> 83      | 51       |  |
| 10       | 9.64442                | 9.95304                | 9.69138                | 10.30862              | 10.04696         | 10.85558            | 50       |  |
| 11       | 64468                  | 95298                  | 69170                  | <b>3</b> 033 <b>0</b> | 04702            | <b>3</b> 5532       | 49       |  |
| 12       | 64494                  | 95292                  | 69202                  | 30798                 | 04708            | 35 <i>5</i> 06      | 48       |  |
| 13       | 64519                  | 95286                  | 69234                  | 30766                 | 04714            | 35481               | 47       |  |
| 14       | 64545                  | 95279                  | 69266                  | 30734                 | 04721            | 85455<br>85429      | 46       |  |
| 15<br>16 | 64571<br>64596         | 95273<br>95267         | 69298                  | 50702                 | 04727<br>04733   | 35429<br>35404      | 45<br>44 |  |
| 17       | 64622                  | 95261<br>95261         | 69329<br>69361         | 30671<br>30639        | 04739            | 35378               | 43       |  |
| 18       | 64647                  | 95254                  | 69393                  | 30607                 | 04746            | \$5353              | 42       |  |
| 19       | 64673                  | 95248                  | 69425                  | 30575                 | 04752            | 35327               | 41       |  |
|          |                        |                        |                        |                       | <u></u>          |                     | -        |  |
| 20       | 9.64698                | 9.95242                | 9.69457                | 10.30543              | 10.04758         | 10 . 35902<br>35276 | 40       |  |
| 21       | 64724                  | 95236                  | 69488                  | 30512                 | 04764            | 35276<br>35251 -    | 39       |  |
| 22       | 64749                  | 95229                  | 69520                  | 30480                 | 04771            | 35251 -<br>35225    | 38       |  |
| 23<br>24 | 6477 <i>5</i><br>64800 | 95223<br>95217         | 69552<br>69584         | 30448<br>30416        | 04777<br>04783   | 35200               | 37<br>36 |  |
| 25       | 64826                  | 95217<br>95211         | 69615                  | 30385                 | 04789            | 3517 <b>4</b>       | 35       |  |
| 26       | 64851                  | 95204                  | 69647                  | 30353                 | 04796            | <b>3</b> 5149       | 34       |  |
| 27       | 64877                  | 95198                  | <b>6</b> 9679          | 30321                 | 04802            | 35123               | 33       |  |
| 28       | 64902                  | 95192                  | 69710                  | 30290                 | 04808            | 35098               | 32       |  |
| 29       | 64927                  | 951 <b>85</b>          | 69742                  | 30258                 | 04815            | 35073               | 31       |  |
| 50       | 9 . 64953              | 9.95179                | 9.69774                | 10.30226              | 10.04821         | 10.35047            | 30       |  |
| 31       | 64978                  | 95173                  | 69805                  | 30195                 | 04827            | <b>3</b> 5022       | 29       |  |
| 32       | 65003                  | 93167                  | 69837                  | <b>3</b> 0163         | 04833            | 34997               | 28       |  |
| 33       | · 65029                | 95160                  | 69868                  | <b>3</b> 0132         | 04840            | 34971               | 27       |  |
| 34       | 6 <b>5</b> 054         | 95154                  | 69900                  | 30100                 | 04846            | 34946               | 26       |  |
| 35       | 65079                  | 95148                  | 69932                  | 30068                 | 04852            | 84921               | 25       |  |
| 36       | 65104                  | 95141                  | 69963                  | 30037                 | 04859            | 34896               | 24       |  |
| 37       | 65130                  | 93185                  | 69995                  | 30005                 | 04865            | 34870               | 23       |  |
| 38       | 65155                  | 95129                  | 70026                  | 29974                 | 04871            | 34845<br>34820      | 22       |  |
| 39       | 65180                  | 95122                  | 700,58                 | 29942                 | 04878            |                     | 21       |  |
| 40<br>41 | 9 . 65205              | 9.95116                | 9.70089                | 10.29911              | 10.04884         | 10.34795<br>34770   | 20<br>19 |  |
| 41       | 65260<br>65255         | 95110<br>95103         | 70121                  | 29879                 | 04890<br>04897   | 34745               | 18       |  |
| 43       | · 65281                | 95103<br>96097         | 70152<br>70184         | 29848<br>29816        | 04903            | 94719               | 17       |  |
| 44       | 65306                  | 96090                  | 70215                  | 29785                 | 04910            | 34694               | 16       |  |
| 45       | 6.7331                 | 9.5084                 | 70247                  | 29753                 | 04916            | 34669               | 15       |  |
| 46       | 65356                  | 95078                  | 70278                  | 29722                 | 01922            | 34644               | 14       |  |
| 47       | 65381                  | 95071                  | 70309                  | 29691                 | 04929            | 34619               | 13       |  |
| 48       | 65406                  | 9 <i>5</i> 06 <b>5</b> | 70341                  | 29659                 | 04935            | 34594               | 12       |  |
| 49       | 65481                  | 95059                  | 70372                  | 29628                 | 04941            | 34569               | 11       |  |
| 50       | 9.65456                | 9.95052                | 9.70404                | 10.29596              | 10.04948         | 10.34544            | 10       |  |
| 51       | 65481                  | 95046                  | 70435                  | 29565                 | 04954            | 34519               | 9        |  |
| 52       | 65506                  | 95039                  | 70466                  | 29534                 | 04961            | 34494               | 8        |  |
| 58       | 65531                  | 9,5038                 | 70498                  | 29502                 | 04967            | 34469               | 7        |  |
| 54       | 65556                  | 95027                  | 70529                  | 29471                 | 04973            | 34444               | 5        |  |
| 55<br>56 | 65580<br>65605         | 95020                  | 70560                  | 29440                 | 04980            | 34420               | 4        |  |
| 57       | 65605<br>65690         | 95014                  | 70592                  | 29408                 | 04986            | 34395<br>34370      | 5        |  |
| 58       | 65655                  | 95007<br>95001         | 70623<br>70654         | 29377<br>29346        | 04993<br>04999   | 34845               | 2        |  |
| 59       | 65680                  | 94995                  | 70685                  | 29315                 | 05005            | 34320               | l i      |  |
| 60       | 65705                  | 94988                  | 70717                  | 29383                 | 05012            | 34295               | 0        |  |
|          | Co-sine.               | Sine.                  | Co-tangent.            | Tangent.              | Co-secant.       | Secant.             | M.       |  |
| -        | 63 Degrees.            |                        |                        |                       |                  |                     |          |  |
| 00 2000  |                        |                        |                        |                       |                  |                     |          |  |

TABLE XI.

LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|          |                       |                    | 27 D            | egrees.        |                |                         | 1        |
|----------|-----------------------|--------------------|-----------------|----------------|----------------|-------------------------|----------|
| M.       | Sine.                 | Co-sine.           | Tangent.        | Co-tangent.    | Secant.        | Co-secant.              |          |
| 0        | 9 . 65705             | 9.94988            | 9.70717         | 10.29283       | 10.05012       | 10.34295                | 60       |
| į        | 65729                 | 9 1982             | 70748           | 29252          | 05018          | 34271                   | 59       |
| 2        | 65754                 | 94975              | 70 <b>7</b> 79  | 29221          | 0.5025         | 34246                   | 58       |
| 8        | 65779                 | 94969              | 70810           | 00102          | 0.5031         | 34221                   | 57       |
| 4        | 65904                 | 94962              | 70841           | 29159          | 05038          | 34196                   | 56       |
| 5        | 65828                 | 94956              | 70873           | 29127          | 05044          | 34172                   | 55       |
| 6        | <b>6</b> 5853         | <b>949</b> 49      | . <b>70</b> 904 | 29096          | 05051          | 34147                   | 54       |
| 7        | 65878                 | . <b>949</b> 43    | 70985           | 29065          | <b>05</b> 057  | S4122                   | 53       |
| 8        | 65902                 | 94936              | 70966           | 29034          | 05064          | <b>34</b> 098           | 52       |
| 9        | 65927                 | 94930              | 70997           | <b>290</b> 03  | 05070          | 34073                   | 51       |
| 10       | 9 . 65952             | 9.94923            | 9.71028         | 10.28972       | 10.05077       | 10.34048                | 50       |
| 11       | 65976                 | 94917              | 71059           | 28941          | 05083          | S4024                   | 49       |
| 12       | 66001                 | 94911              | 71090           | 28910          | 05039          | 33999                   | 48       |
| 13.      | 66025                 | 94904              | 71121           | 28879          | 05096          | 33975                   | 47       |
| 14       | 66050                 | 94898              | 71153           | 28847          | 05102          | 339 <i>5</i> 0          | 46       |
| 15       | 66075                 | 94 <del>8</del> 91 | 71184           | 28816          | 05109          | 33925                   | 45       |
| 16       | 66 399                | 94884              | 71215           | 28785          | 05116          | 33901                   | 44       |
| 17       | 66124                 | 94978              | 71246           | 28754          | 05122          | 33876                   | 43       |
| 18       | 66148                 | 94871              | 71277           | 28723          | 05129          | 33852                   | 42       |
| 19       | 66173                 | 94865              | 71308           | 28692          | 05135          | 33827                   | 41       |
| 20       | 9.66197<br>66221      | 9.94858            | 9.71339         | 10.23661       | 10.05142       | 10.33803                | 40       |
| 22       | 66246                 | 94852              | 71970           | 28630          | 05148          | 33779                   | 39       |
| 25       | 66270                 | 94845              | 71401           | 28599          | 05155          | \$3754                  | 38       |
| 24       | 66295                 | 94839              | 71491           | 28369          | 05161          | 33730                   | 37       |
| 25       | 66319                 | 94832              | 71462<br>71493  | 28538<br>28507 | 05168          | 33705                   | 36       |
| 26       | 66343                 | 94826<br>94819     | 71493           | 28476          | 05174<br>05181 | 33681<br>386 <i>5</i> 7 | 35       |
| 27       | 66968                 | 94813              | 71555           | 28445          | 05181          | 33632                   | 34       |
| 28       | 66392                 | 94806              | 71586           | 28414          | 05194          | 33632<br>33608          | 33<br>32 |
| 29       | 66416                 | 94799              | 71617           | 28383          | 05201          | 33584                   | 31       |
| 30       | 9.66441               | 9.94793.           | 9.71648         | 10.28352       | 10.05207       | 10.33559                | 30       |
| 91       | 66465                 | 94786              | 71679           | 28321          | 05214          | 33535                   | 29       |
| 32       | 66489                 | 94780              | 71709           | 28291          | 05220          | 33511                   | 28       |
| 33       | 66819                 | 94778              | 71740           | 23260          | 05227          | 33487                   | 27       |
| . 34     | 66537                 | 94767              | 71771           | 28229          | 05233          | 3 <b>34</b> 63          | 26       |
| 35       | 66562                 | 94760              | 71802           | 28198          | 05240          | <b>334</b> 38           | 25       |
| 36       | 66586                 | 94753              | 71833           | 28167          | 05247          | 33414                   | 24       |
| 37       | 66610                 | 94747              | 71863           | 28137          | 05253          | 33390                   | 23       |
| 38       | <b>66</b> 63 <b>4</b> | 94740              | 71894           | 28106          | 05260          | 33366                   | 22       |
| 39       | 666.58                | 94794              | 71925           | 28075          | 05266          | · 93342                 | 21       |
| 40       | 9 . 66682             | 9.94727            | 9.71955         | 10.28045       | 10.05273       | 10.33318                | 20       |
| 41       | 66706                 | 94720              | 71986           | 28014          | 05280          | 33294                   | 19       |
| 42       | 66731                 | 94714              | 72017           | 27983          | 05286          | 33269                   | 18       |
| 43       | 66755                 | 94707              | 72048,          | 27952          | 05293          | 33245                   | 17       |
| 44       | 66779                 | 94700              | 72078           | 27922          | 05300          | 33221                   | 16       |
| 45       | 66809                 | 91694              | 72109           | 27891          | 05306          | 33197                   | 15       |
| 46       | 66827                 | 94687              | 72140           | 27860          | 05813          | 33173                   | 14       |
| 47       | 66851                 | 94680              | 72170           | 27830          | 05920          | . 33149                 | 13       |
| 48<br>49 | 66875 -<br>66899      | 94674<br>94667     | 72201<br>72231  | 27799<br>27769 | 05326<br>05333 | 83125<br>· 33101        | 12<br>11 |
| 50       | 9.66922               | 9.94660            | 9.72262         | 10.27738       | 10.05349       | 10.33078                | 10       |
| 51       | 66946                 | 94654              | 72293           | 27707          | 05346          | 3305 <b>4</b>           | 9        |
| 52       | 66970                 | 94647              | 72323           | 27677          | 05353          | 33030                   | 8        |
| 53       | 66994                 | 94640              | 72954           | 27646          | 05360          | 33006                   | 7        |
| 54       | 67018                 | 94684              | 72384           | 27616          | 05365          | 32932                   | 6        |
| 55       | 67042                 | 94627              | 72415           | 27585          | 05373          | 32958                   | 5        |
| 56       | 67066                 | 94620              | 72445           | 27555          | 05380          | 32934                   | 4        |
| 57       | 67090                 | 94614              | 72476           | 27524          | 05386          | 32910                   | 3        |
| '58      | 67113                 | 94607              | 72506           | 27494          | 05393          | 32887                   | 2        |
| 59       | 67137                 | 94600              | 72537           | 27463          | 05300          | 32863                   | ī        |
| 60       | 67161                 | 94593              | 72567           | 27438          | 05407          | 32839                   | 0        |
|          | Co-sine.              | Sine.              | Co-tangent.     | Tangent.       | Co-secant.     | Secant.                 | M.       |

TABLE XI.

| LOGARITHMIC SINES. | TANCENTS. | AND | SECANTS. |
|--------------------|-----------|-----|----------|
|--------------------|-----------|-----|----------|

|          | 28 Degrees.            |                         |                |                |                   |                       |          |
|----------|------------------------|-------------------------|----------------|----------------|-------------------|-----------------------|----------|
| M.       | Sine.                  | Co-sine.                | Tangent.       | Co-tangent.    | Secant.           | Co-secant.            |          |
| 0        | 9.67161                | 9 . 94593               | 9.72567        | 10.27499       | 10.05407          | 10 . 52839            | 60       |
| 1        | 67185                  | 94587                   | 72598          | 27402          | 05413             | 32815                 | 59       |
| " 2      | 67208                  | 94580                   | 72628          | 27372          | 05420             | 32795                 | 58       |
| 3        | 67232                  | 94573                   | 72659          | 27341          | 05427             | 32768                 | 57       |
| 4        | 67256                  | 94567                   | 72689          | . 27311        | 05493             | 32744                 | 56       |
| 5        | 67280                  | 94560                   | 72720          | 27280          | 05440             | 32720                 | 55       |
| 6        | 67303                  | 94553                   | 72750          | 27250          | 05447             | 32697                 | 54       |
| 7        | 67327                  | 9454 <b>6</b>           | 72780          | 27220          | 05454             | <b>3257</b> 3         | 53       |
| 8        | 67350                  | 94540                   | 72811          | 27189          | 05460             | <b>3265</b> 0         | 52       |
| 9        | 67374                  | 94533                   | 72841          | 27159          | 05467             | 32626                 | 51       |
| 10       | 9.67398                | 9 . 94526               | 9.72872        | 10.27128       | 10.05474          | 10. 32602             | 50       |
| 11       | 67421                  | 94519                   | 72902          | 27098          | 05481             | 32579                 | 49       |
| 12       | 67445                  | 94513                   | 72932          | 27068          | 05487             | 32555                 | 48       |
| 13       | 67468                  | 94506                   | 72963          | 27037          | 05494             | 32532                 | 47       |
| 14       | 67492                  | 94499                   | 72993          | 27007          | 05501             | 32508                 | 45       |
| 15       | 67515                  | 94492                   | 73023          | 26977          | 05508             | 32485                 | 44       |
| 16       | 67539                  | 94485                   | 73054          | 26946          | 05515             | 92461<br>92438        | 43       |
| 1,7      | 67562                  | 94479                   | 73084          | 26916          | 05521             | 32414                 | 42       |
| 18<br>19 | 67586<br>67609         | 94472<br>94465          | 73114<br>73144 | 26886<br>26856 | 05528<br>05535    | 32391                 | 41       |
| 20       | 9.67633                | 9.94458                 | 9.73175        | 10 . 26825     | 10.05542          | 10.32367              | 40       |
| 21       | 67656                  | 94451                   | 73205          | 26795          | 05549             | 32944                 | 39       |
| 22       | 67680                  | 94445                   | 73235          | 26765          | 05555             | 32320                 | 58       |
| 23       | 67703                  | 94438                   | 73265          | 26735          | 05562             | 32297                 | 37       |
| 24       | 67726                  | 94431                   | 73295          | 26705          | 05569             | 32274                 | 36       |
| 25       | 67750                  | 94424                   | 73326          | 26674          | 05576             | 32250                 | 35       |
| 26       | 67773                  | 94417                   | 73356          | 26644          | <b>0558</b> 3     | 32227                 | 34       |
| 27       | 67796                  | 94410                   | 73386          | 26614          | 05590             | 32204                 | 33       |
| 28       | 67820                  | 94404                   | 73416          | 26584          | 05596             | 32180                 | 32       |
| 29       | 67843                  | 94397                   | 73446          | 26554          | 05603             | 32157                 | 51       |
| 30       | 9.67866                | 9.94390                 | 9.73476        | 10 . 26524     | 10.05610          | 10.32134              | 30       |
| 31       | 67890                  | 94383                   | 73507          | 26493          | 05617             | 32110                 | 29       |
| 32       | 67913                  | 94376                   | 73537          | 26463          | 05624             | <b>32087</b><br>32064 | 28<br>27 |
| 33       | 67936                  | 94369                   | 73567          | 26433          | 05631             | 3204<br>32041         | 26       |
| 34       | 67959                  | 94362                   | 73397          | 26403<br>26373 | 05638<br>05645    | 32018                 | 25       |
| 35       | 67982                  | 94355                   | 73627          | 26348          | 0 <b>56</b> 51    | 31994                 | 24       |
| 36       | 68006                  | 94349                   | 73657          | 26313          | 05658             | 31971                 | 23       |
| 37       | 68029                  | 94342                   | 73687<br>73717 | 26283          | 05665             | 31948                 | 22       |
| 38<br>39 | 68052<br>6807 <i>5</i> | 94335<br>94328          | 737-17         | 26253          | 05672             | 31925                 | 21       |
| 40       | 9.68098                | 9.94321                 | 9.73777        | 10.26223       | 10 . 05679        | 10.31902              | 20       |
| 41       | 68121                  | 94314                   | 73807          | 26193          | 05686             | 31879                 | 19       |
| 42       | 68144                  | 94307                   | 73837          | 26163          | 05693             | 31856                 | 18       |
| 43       | 68167                  | 94900                   | 73867          | 26133          | 05700             | · 31833               | 17       |
| 44       | 68190                  | 94293                   | 73897          | 26103          | 05707             | 31810                 | 16       |
| 45       | 68213                  | 94286                   | 73927          | 26073          | 05714             | S1787                 | 15       |
| 46       | 68237                  | 94279                   | 73957          | 26043          | 05721             | 31 <b>763</b>         | 14       |
| 47       | 68260                  | 94273                   | 78987          | 26013          | 05727             | 31740                 | 13       |
| 48       | 63283                  | 94266                   | 74017          | 25983          | 0573 <del>4</del> | 31717                 | 12       |
| 49       | 68305                  | 94259                   | ` 74047        | 25953          | 05741             | 31695                 | 11       |
| 50       | 9.68328                | 9.94252                 | 9.74077        | 10 . 25923     | 10.05748          | 10.31672              | 10       |
| 51       | 68351                  | 94245                   | 74107          | 25893          | 05755             | 31649                 | 9        |
| 52       | 68374                  | 94238                   | 74137          | 25863          | 03762             | 31626                 | 8 7      |
| 53       | 63397                  | 94231                   | 74166          | 25834          | 05769             | 31603<br>31580        | 6        |
| 54       | 68420                  | 94224                   | 74196          | 25804<br>95774 | 05776<br>05783    | \$1557                | 5        |
| 5.5      | 69443                  | 94217                   | 74226          | 25774<br>25744 | 05783<br>05790    | 31557<br>31534        | 4        |
| 56       | 68466                  | 94210                   | 74256<br>74286 | 25744<br>25714 | 05797             | 31531                 | 3        |
| 57<br>58 | 68489<br>68519         | 94203<br>941 <b>9</b> 6 | 74266<br>74316 | · 25684        | 05804             | 31488                 | 2        |
| 58<br>59 | 68512<br>68534         | 94196                   | 74945          | 25655          | 05811             | 31466                 | Ī        |
| 60       | 68557                  | 94182                   | 74375          | 25625          | 05818             | 31443                 | 0        |
|          | Co-sine.               | Sine.                   | Co-tangent.    | Tangent.       | Co-secant.        | Secant.               | М.       |

LOGARITHMIC SINES, TANGENTS, AND SECANTS.
29 Degrees.

|          |                 |                                |                | egrees.                 |                  |                        |          |
|----------|-----------------|--------------------------------|----------------|-------------------------|------------------|------------------------|----------|
| M.       | Sine.           | Co-tine.                       | Tangent.       | Co-tangent.             | Secant.          | Co-secant.             |          |
| 0        | 9.68557         | 9.94182                        | 9.74975        | 10 . 25625              | 10.05818         | 10.31443               | 60       |
| 1 2      | 68580           | 94175                          | 7440.5         | 25595                   | 05825            | 31420                  | 59       |
| 3        | 68603<br>68625  | 94168<br>94161                 | 74485<br>74465 | 25565<br>25535          | 05832<br>· 05839 | 31397<br>31375         | 58<br>57 |
| 4        | 68648           | 94154                          | 74494          | 25506                   | 05846            | 31373                  | 56       |
| 5        | 68671           | 94147                          | 74524          | 25476                   | 05853            | 31329                  | 55       |
| 6        | 68694           | 94140                          | 74554          | 25446                   | 05860            | 31306                  | 54       |
| 7        | 68716           | 94133                          | 74589          | 25417                   | 05867            | 31284                  | 53       |
| 8        | 68739           | 94126                          | 74619          | 25387                   | 05874            | 31261                  | 52       |
| 9        | 68762           | 94119                          | 74643          | 25357                   | 05881            | 31238                  | 51       |
| 10       | 9.68784         | 9.94112                        | 9.74673        | 10.25327                | 10.05888         | 10.31216 -             | 50       |
| 11       | 68807           | 94105                          | 74702          | 25298                   | 05895            | 31193                  | 49       |
| 12       | 68829.          | 94098                          | 74732          | 25268                   | 05902            | 31171                  | 48       |
| 13       | 68852<br>.68875 | 94090                          | 74762          | 25238.<br>25209         | 05910            | 31148                  | 47       |
| 15       | 68897           | 94083<br>94076                 | 74791<br>74821 | 25179                   | 05917<br>05924   | 31125_<br>31103        | 46<br>45 |
| 16       | 68920           | 94069                          | 74851          | 25149                   | 05931            | 31080                  | 44       |
| 17       | 68942           | 94062                          | 74880          | 25120                   | 05938            | 31058                  | 49       |
| 18       | 68965           | 94055                          | 74910          | 25090                   | 05945            | 31035                  | 42       |
| 19       | 68987           | 94048                          | <b>749</b> 39  | 25061                   | 05952            | S101 <b>3</b>          | 41       |
| 90       | 9.69010         | 9 · 94041                      | 9.74969        | 10.25031                | 10.05959         | 10.30990               | 40       |
| 21       | 69032           | 94034                          | 74998          | 25002                   | 05966            | 30968                  | 39       |
| 22       | 69055           | 94027                          | 76028          | 24972                   | 05973            | S0945                  | 38       |
| 23       | 69077           | 94020                          | 75058          | 24942                   | 05980            | 30923                  | 37       |
| 94       | 69100           | 94012                          | 75087          | 24913                   | 05988            | 30900                  | 36       |
| 25       | 69122           | 94005                          | 75117          | 24883                   | 05995            | 30878                  | 35 ·     |
| 26       | 69144           | 99998                          | 75146          | 24854                   | 06002            | 30856                  | 34       |
| 27       | 69167           | 93991                          | 75176          | 24824                   | 06009            | 30833.                 | 33       |
| 28<br>29 | 69189<br>69212  | 93984                          | 75205          | . 24795<br>24765        | 06016            | 30811<br>30788         | 32       |
|          | ·               | 93977                          | 75235          |                         | 06023            | <u> </u>               |          |
| 80       | 9 . 69234       | 9.93970                        | 9.75264        | 10.24786                | 10.06030         | 10.30766               | 30       |
| 31       | 69256           | 93963                          | 75294          | 24706                   | <b>0</b> 6037    | 30744                  | 29       |
| 32<br>33 | 69279<br>69301  | 99955                          | 75323          | 24677<br>24647          | 06045            | 30721                  | 28<br>27 |
| 33       | 69323           | 93948<br>93941                 | 75353<br>75382 | 24618                   | 06052<br>06059   | 30699<br>30677         | 26       |
| 35       | 69545           | 93934                          | 75411          | 24589,                  | 06066            | 30855                  | 25       |
| 36       | 69368           | 93927                          | 75441          | . 24559                 | 06073            | <b>3</b> 0632          | 24       |
| 37       | 69390           | 93920                          | 75470          | 24530                   | 06030            | 30610                  | 23       |
| 38       | 69412           | 93912                          | 75500          | 24500                   | 06088            | 3058 <b>8</b>          | 22       |
| 39       | 69434           | 98905                          | 75529          | 24471                   | 06095            | 30566                  | 21       |
| 40       | 9.69456         | 9.98898                        | 9.75558        | 10.24442                | 10.06102         | 10 . 39544             | 20       |
| 41       | 69479           | 93891                          | . <b>75588</b> | 24412                   | 06109            | 30521                  | 19       |
| 42       | <b>695</b> 01   | 93884                          | 75617          | 24383                   | 06116            | 30499                  | 18       |
| 48       | 69528           | 93876                          | 75647          | 24858                   | 06124            | 30477                  | 17       |
| 44       | <b>6</b> 9545   | 93869                          | 75676          | 24324<br>94905          | 06131            | 80155<br>9043 <b>9</b> | 16<br>15 |
| 46       | 69567<br>69589  | 938 <b>62</b><br>938 <i>55</i> | 75705<br>75735 | 24295<br>24265          | 06138<br>06145   | 30433<br>30411         | 14       |
| 47       | <b>6</b> 9611   | 93847                          | 75764          | 24236                   | 06153            | 30389                  | 13       |
| 48       | 69633           | 93840                          | 75793          | 24207                   | 06160            | 30367                  | 12       |
| 49       | 696 <i>55</i>   | 99833                          | 75822          | 24178                   | 06167            | 30345                  | ii       |
| 50       | 9. 69677        | 9.93826                        | 9.75852        | 10.24148                | 10.06174         | 10.80828               | 10       |
| 51       | 69699           | 93819                          | 7 <i>5</i> 881 | 24119                   | 06181            | 30301                  | 9        |
| 52       | 69721           | 93811                          | 75910          | 24090                   | 06189            | 30279                  | 8        |
| 53       | 69743           | 93804                          | 75939          | 24361                   | 06196            | 3025 <b>7</b>          | 7        |
| 54       | 69765           | 99797                          | 75969          | 24031                   | 06203            | <b>3</b> 023 <b>5</b>  | 6        |
| 55       | <b>6</b> 9787   | 93789                          | 75998          | 24002                   | 06211            | 30213                  | 3        |
| 56       | 69809           | 93782                          | 76027          | 23973                   | 06218            | 30191                  | 4        |
| 57       | 69831           | 93775                          | 76056          | 23944                   | 06225            | 30169<br>30147         | 3 2      |
| 58<br>59 | 69853<br>69875  | 93768<br>93760                 | 76036<br>76115 | 23914<br>238 <b>8</b> 5 | 06232<br>06240   | 30147<br>30125         | 1        |
| 60       | 69897           | 93760<br>937 <i>5</i> 8        | 76144          | 23 <b>8</b> 56          | 06217            | 30123                  | o        |
| ,        | Co-sine.        | Sine                           | Co-tangent.    | Tangent.                | Co-secant.       | Secant.                | M.       |

| LOGARITHMIC | SINES, | TANGENTS, | AND | SECANTS. |
|-------------|--------|-----------|-----|----------|
|             | 30     | Degrees   |     |          |

|            | 30 Degrees.                     |                         |                        |                     |                                  |                     |          |
|------------|---------------------------------|-------------------------|------------------------|---------------------|----------------------------------|---------------------|----------|
| M.         | Sine.                           | Co-sine.                | Tangent.               | Co-tangent.         | Secant.                          | Co-secant.          |          |
| 0          | 9.69897                         | 9.93753                 | 9.76144                | 10.23856            | 10.06247                         | 10 . 30103          | 60       |
| 1          | 69919                           | 93746                   | 76173                  | 23827               | 06254                            | 30081               | 59       |
| 2          | 69941<br>60069                  | 93738                   | 76202                  | 23798               | 06262                            | 30059               | 58       |
| 3 4        | 69963<br>69984                  | 93731<br>93724          | 76231<br>76261         | 23769<br>23739      | 06269<br>06276                   | 30037<br>30016      | 57<br>56 |
| 5          | 70006                           | 93717                   | 76290                  | 23710               | 06283                            | 29994               | 55       |
| 6          | 70028                           | 93709                   | 76319                  | 23681               | 06291                            | 29972               | 54       |
| 7          | 70050                           | 93702                   | 76348                  | 23652               | 06298                            | 29950               | 53       |
| 8          | 70072                           | 93695                   | 76377                  | 23623               | 06305                            | 29928               | 52       |
| 9          | 70093                           | 93687                   | 76406                  | 23594               | 06313                            | 29907               | 51       |
| 10         | 9.70115                         | 9 . 93680               | 9.76435                | 10.23563            | 10.06320                         | 10.29885            | 50       |
| 11         | 70137                           | 93673<br>93665          | 76464                  | 23536               | 06327                            | 29863               | 49       |
| 12<br>13   | 701 <i>5</i> 9<br><b>70</b> 180 | 95658                   | 76493<br><b>765</b> 22 | 23507<br>23478      | 0633 <i>5</i><br>06342           | .29841<br>29820     | 48       |
| 14         | 70202                           | 93650                   | 76551                  | 23449               | 06350                            | 29798               | 46       |
| 15         | 70224                           | 93643                   | 76580                  | 23420               | 06357                            | 29776               | 45       |
| 16         | 70245                           | <b>93</b> 636           | 76609                  | 23391               | 06364                            | <b>29</b> 755       | 44       |
| 17         | 70267                           | 93628                   | 76639                  | 23361               | 06872                            | <b>297</b> 33 ·     | 43       |
| 18         | 7,0288                          | 93621                   | 76668                  | 23332               | .06379                           | <b>297</b> 12       | 42       |
| 19         | 70310                           | 93614                   | 76697                  | 23303               | 06386                            | 29690               | 41       |
| 20         | 9.70332                         | 9.93606                 | 9.76725                | 10.23275<br>23246   | 10.06394                         | 10.29668            | 40       |
| 21<br>22   | 70353<br>7037 <i>5</i>          | 93 <i>5</i> 99<br>93591 | 76754<br>76788         | 23246<br>23217      | 06401<br>06409                   | 29647<br>29625      | 39<br>38 |
| 23         | 70896                           | 93584                   | 76812                  | 23188               | 06416                            | 29025<br>29604      | 37       |
| 24         | 70418                           | 93577                   | 76841                  | 23159               | 06423                            | 29582               | 36       |
| 25         | 70439                           | 93569                   | 76870                  | 23130               | 06431                            | 29561               | 35       |
| 26         | 70461                           | 93562                   | 76899                  | 25101               | 06438                            | 29539               | 34       |
| 27         | 70482                           | <b>93</b> 554           | 76928                  | <b>2307</b> 3       | 06446                            | 29518               | 33       |
| 28         | 70504                           | 93547                   | 76957                  | <b>23</b> 043       | 06453                            | <b>294</b> 96       | 32       |
| 29         | 70525                           | 93539                   | 76986                  | 23014               | 06461                            | 29475               | 31       |
| 30         | 9.70547                         | 9 . 93532               | 9.77015                | 10.22985            | 10.06468                         | 10.29453            | 30       |
| 31         | 70568                           | 93525                   | 77044.                 | 22956               | 06475                            | 29432               | 29       |
| 32         | 70590<br>70611                  | 93517                   | 77073<br>77101         | 22927 \<br>22899    | 06483                            | 29410               | 28<br>27 |
| 33<br>34   | 70633                           | 93510<br>93502          | 77130                  | 22870               | 06490<br>06498                   | 29389<br>29367      | 26       |
| 35         | 70654                           | 93495                   | 77159                  | 22841               | 06505                            | 29346               | 25       |
| 36         | 70675                           | 93487                   | 77188                  | 22812               | 06513                            | 29325               | 24 .     |
| 87         | 70697                           | 93480                   | 77217                  | 22783               | 06520                            | 29303               | 23       |
| 138        | 70718                           | 93472                   | 77246                  | 22754               | 06528                            | 29282               | 22       |
| 39         | 70789                           | 93465                   | 77274                  | 22726               | <b>0</b> 6535                    | 29261               | 21       |
| 40         | 9.70761                         | 9.93457                 | 9.77803                | 10.22697            | 10.06543                         | 10 . 29239          | 20<br>19 |
| 41<br>42   | 70782<br><b>708</b> 03          | 93450<br>93442          | 77832<br>77361         | 22668<br>22639      | 06550<br>06558                   | 29218<br>29197      | 18       |
| 43         | 70824                           | 93435                   | 77390                  | 22639<br>22610      | 06565                            | 29176<br>29176      | 17       |
| 44         | 70846                           | 93427                   | 77418                  | 22582               | 06573                            | 29154               | 16       |
| 45         | 70867                           | 99420                   | 77447                  | 22553               | 06580                            | 29133               | 15       |
| 46         | 70888                           | 93412                   | 77476                  | 22524               | 06588                            | 29112               | 14       |
| 47         | 70909                           | 93405                   | 77505                  | 22495               | 06595                            | 29091               | 13.      |
| .48        | 70931                           | 93397                   | 7 <b>75</b> 38         | 22467               | 06603                            | 29069               | 12       |
| 49         | 70952                           | 93390                   | 77562                  | 22438               | 06610                            | 29048               | 11       |
| 50<br>51   | 9.70973<br>70994                | 9.93382<br>93375        | 9.77591<br>77619       | 10 . 22409<br>22381 | 10.06618<br>06625                | 10 . 29027<br>29006 | 10<br>9  |
| 52         | 71015                           | 93367                   | 77648                  | 22352               | 06633                            | 2898 <i>5</i>       | 8        |
| 53         | 71036                           | 93360                   | 77677                  | 22323               | 06640                            | 28964               | 7        |
| 54         | 71058                           | 93352                   | 77706                  | 22294               | <b>86</b> 648                    | 28942               | 6        |
| 55         | 71079                           | 99344                   | 7773 <del>4</del>      | 22266               | 06656                            | 28921               | 5        |
| <b>5</b> 6 | 71100                           | 99337                   | 77768                  | 22237               | 06668                            | 28900               | 4        |
| 57         | 71121                           | 93329                   | 77791                  | 22209               | 06671                            | 28879               | 3        |
| 58<br>50   | 71142                           | 98322                   | 77820                  | 22180               | 06678                            | 28858               | 2<br>1   |
| 59<br>60   | 71163<br>71184                  | 93314<br>93307          | 77849<br>77877         | 22151<br>22123      | <b>066</b> 86<br>- <b>066</b> 93 | 28837<br>28816      | 0        |
|            | Co-sine.                        | Sine.                   | Co-tangent.            | Tangent.            | Co-secant.                       | Secant.             | М.       |
| . 1        |                                 |                         | ,                      |                     | 1                                | · ~~~~~             |          |

|            | S1 Degrees.            |                          |                         |                |                |                            |          |  |
|------------|------------------------|--------------------------|-------------------------|----------------|----------------|----------------------------|----------|--|
| М.         | Sine.                  | Co-sine.                 | Tangent.                | Co-tangent:    | Secant.        | Co-secant.                 |          |  |
| 0          | 9.71184                | 9.93907                  | 9.77877                 | 10.22123       | 10.06693       | 10.28816                   | 60       |  |
| 1          | 71205                  | 98299                    | · 77906                 | 22094          | 06701          | <b>≨8</b> 795              | 59       |  |
| 2          | 71226                  | - <b>9</b> 8 <b>2</b> 91 | 77935                   | 22065          | 06709          | 28774                      | 58       |  |
| 3          | 71247                  | 93284                    | 77965                   | 22037          | 06716          | 28753                      | 57       |  |
| 4          | 71268                  | 93276                    | 77992                   | 22008          | 06724          | 28732                      | 56       |  |
| 5          | 71289                  | 93269                    | 78020                   | 21980          | 06731          | 28711                      | 55       |  |
| 6          | 71310                  | 99261                    | 78049                   | 21951          | 06789          | 28690                      | 54       |  |
| 7          | 71331                  | 98253                    | 78077                   | 21923          | 06747          | 28669                      | 53       |  |
| 8          | 71952                  | 98946                    | 78106                   | 21894          | 06754          | 28649                      | 52       |  |
| 9          | 71373                  | 93238                    | 78195                   | 21865          | 06762          | 28627                      | 51       |  |
| 10<br>11   | 9.71393                | 9,93230<br>93223         | 9.78163<br>78192        | 10.21837       | 10.06770       | 10.28607<br>28 <i>5</i> 86 | 50<br>49 |  |
| 12         | 71414<br>71435         | 93225                    | 78192<br>782 <b>2</b> 0 | 21808<br>21780 | 06777<br>06785 | 28565                      | 48       |  |
| 13         | 71456                  | 93207                    | 78249                   | 21751          | 06793          | 28544                      | 47       |  |
| 14         | 71477                  | 93200                    | 78277                   | 21723          | 06800          | 28523                      | 46       |  |
| 15         | 71498                  | 93192                    | 78306                   | 21694          | 06808          | 28502                      | 45       |  |
| 16         | 71519                  | 93184                    | 78334                   | 21666          | 06816          | 28481                      | 44       |  |
| 17         | 71539                  | 98177                    | 78363                   | 21637          | 06823          | 28461                      | 43       |  |
| 18         | 71560                  | 93169                    | 78391                   | 21609          | 06831          | 28440                      | 42       |  |
| 19         | 71581                  | 93161                    | 78419                   | 21581          | 06839          | 28419                      | 41       |  |
| 20         | 9.71602                | 9.93154                  | 9.78448                 | 10.21552       | 10.06846       | 10,28598                   | 40       |  |
| 21         | 71622                  | 93146                    | 78476                   | 21524          | 06854          | 28378                      | 39       |  |
| 22         | 71643                  | 93138                    | 78505                   | 21495          | 06862          | 28357                      | 38       |  |
| 23         | 71664                  | 93131                    | 78533                   | 21467          | 06869          | 28336                      | 37       |  |
| 24         | 71685                  | 93123                    | 78562                   | 21438          | 06877          | 28315                      | 36       |  |
| 25         | 71705                  | 93115                    | 78590                   | 21410          | 06885          | 28295                      | 35       |  |
| 26         | 71726                  | 93108                    | 78618                   | 21382          | 06892          | 28274                      | 34       |  |
| 27<br>28   | 71747                  | 93100                    | 78647                   | 21353          | 06900          | 28253                      | 35       |  |
| 29         | 71767                  | 93092<br>93084           | 78675<br>78704          | 21325<br>21296 | 06908          | 28233<br>2821 <b>2</b>     | 32<br>31 |  |
|            | 71788                  |                          |                         |                | 06916          |                            |          |  |
| 30         | 9.71809                | 9 93077                  | 9.78792                 | 10.21268       | 10.06928       | 10.28191                   | 30       |  |
| 32         | 71829<br>71850         | 93069<br>93061           | 78760<br>78789          | 21240          | 06931          | 28171<br>28150             | 29<br>28 |  |
| 33         | 71870                  | 93053                    | 78817                   | 21211<br>21183 | 06939<br>06947 | 28130                      | 27       |  |
| 34         | 71891                  | 93046                    | 78845                   | 21155          | 06954          | 28109                      | 26       |  |
| '35        | 71911                  | 93038                    | 78874                   | 21126          | 06962          | 28089                      | 25       |  |
| 36         | 71932                  | 93030                    | 78902                   | 21098          | 06970          | 28068                      | 24       |  |
| 37         | 71952                  | 93022                    | 78930                   | 21070          | 06978          | 28048                      | 23       |  |
| 38         | 71973                  | 99014                    | 78959                   | 21041          | 06986          | 28027                      | 22       |  |
| 39         | 71994                  | 93007                    | 78987                   | 21013          | 06993          | 28006                      | 21       |  |
| 40         | 9.72014                | 9.92999                  | 9.79015                 | 10.20985       | 10.07001       | 10.27986                   | 20       |  |
| 41         | 72034                  | 92991                    | 79043                   | 20957          | 07009          | 27966                      | 19       |  |
| 42         | 72055                  | 92983                    | 79072                   | 20928          | 07017          | 27945                      | 18       |  |
| 44         | 7207 <i>5</i><br>72096 | 92 <b>9</b> 76<br>92968  | 79100<br>79128          | 20900<br>20872 | 07024<br>07032 | 27925<br>27904             | 17<br>16 |  |
| 45         | 72096<br>72116         | 92960<br>92960           | 79156                   | 20872<br>20844 | 07032          | 27884                      | 15       |  |
| 46         | 72137                  | 92952                    | 79185                   | 20815          | 07048          | 27863                      | 14       |  |
| 47         | 72157                  | 92944                    | 79213                   | 20787          | 07056          | 27843                      | 18       |  |
| 48         | 72177                  | 92936                    | 79241                   | 20759          | 07064          | 27823                      | 12       |  |
| 49         | 72198                  | 92929                    | 79269                   | 20731          | 07071          | 27802                      | 11       |  |
| <b>5</b> 0 | 9.72218                | 9 . 92921                | 9.79297                 | 10.20703       | 10 .07079      | 10.27782                   | 10       |  |
| 51         | 72238                  | 92913                    | 79326                   | 20674          | 07087          | 27762                      | 9        |  |
| 52         | 72259                  | 92905                    | 79354                   | 20646          | 07095          | 27741                      | 8        |  |
| 53         | 72279                  | 92897                    | 79382                   | 20618          | C7103          | 27721                      | 7        |  |
| 54         | 72299                  | 92889                    | 79410                   | 20590          | 07111          | 27701                      | 6        |  |
| 55<br>56   | 72320                  | 92881                    | 79438                   | 20562          | 07119          | 27680                      | 5        |  |
| 56<br>57   | 72340                  | 92874                    | 79466                   | 20534          | 07126          | 27660<br>27640             | 4        |  |
| 58         | 72360<br>72381         | 92866<br>92858           | 79495<br>79523          | 20505<br>20477 | 07134<br>07142 | 27619                      | 3 2      |  |
| 59         | 72401                  | 92850                    | 79551                   | 20417          | 07150          | 2759 <b>9</b>              | î        |  |
| 60         | 72421                  | 92842                    | 79579                   | 20421          | 07158          | 27579                      | ò        |  |
|            | Co-sine.               | Sine.                    | Co-tangent.             | Tangent.       | Co-secant.     | Secant.                    | M.       |  |
|            | CO-sinc.               | - Dille.                 |                         | arece          | 1 CO-secure    | i becane.                  | 1        |  |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|          |                  | <del></del>      | 32 De            | grees.                | <del></del>    | ·                      |          |
|----------|------------------|------------------|------------------|-----------------------|----------------|------------------------|----------|
| M.       | Sine.            | Co-sine.         | Tangent.         | Co-tangent.           | Secant.        | Co-secant.             |          |
| Ò        | 9.72421          | 9.92842          | 9.79579          | 10.20421              | 10.07158       | 10 . 27579             | 60       |
| 1 1      | 72441            | 92894            | 79607            | 20393                 | 07166          | 27559                  | 59       |
| 2        | 72461            | 92826            | 79635            | <b>2</b> 036 <b>5</b> | 07174          | <b>2</b> 7539          | 58       |
| . 3      | 72482            | 92818            | 79663            | 20337                 | 07182          | 27518                  | 57       |
| 4        | 72502            | 92810            | 79691            | 20309                 | 07190          | <b>274</b> 98          | 56       |
| . 5      | 72522            | 92803            | 79719            | 20281                 | 07197          | 27478                  | 55       |
| 6        | 72542            | 92795            | 79747            | 20253                 | 07205          | 27458                  | 54       |
| 7        | 72562            | 92787            | 79776            | 20224                 | 07213          | 27438                  | 53       |
| - 8      | 72382            | 92779            | 79304            | 20196                 | 07221          | 27418                  | 52       |
| 9        | 72602            | 92771            | 79832            | 20168                 | 07229          | 27398                  | 51       |
| 10       | 9.72622          | 9.92763          | 9.79860          | 10.20140              | 10.07237       | 10.27378               | 50       |
| 11       | 72643            | 92755            | 79888            | 20112                 | 07245          | 27357                  | 49       |
| . 12     | 72663            | 92747            | 79916            | 20084                 | 07253          | 27337                  | 48       |
| 13       | 72683            | 92739            | 79944            | 20056                 | 07261          | 27317                  | 47       |
| 14       | 72703            | 92731            | 79972            | 20028                 | 07269          | 27297                  | 46       |
| 15<br>16 | 72723            | 92728            | 80000            | 20000                 | 07277          | 27277                  | 45       |
| 17       | 72743            | 92715            | 80028            | 19972                 | 07285          | 27257                  | 44       |
|          | 72763            | 92707            | 80056            | 19944                 | 07293          | 27237                  | 43       |
| 18       | 72783            | 92699            | 80084            | 19916                 | 07301          | 27217                  | 42       |
| 19       | 72803            | 92691            | 80112            | 19888                 | 07309          | 27197                  | 41       |
| 20       | 9.72823          | 9.92683          | 9.80140          | 10.19860              | .10.07317      | 10.27177               | 40       |
| 21       | 72843,           | 92675            | 80168            | 19832                 | 07325          | 27157                  | 39       |
| 22       | 72863            | 92667            | 80195            | 19805                 | 07833          | 27137                  | 38       |
| 23       | 72883            | 92659            | 80223            | 19777                 | 07341          | 27117                  | 37       |
| 24       | 72902            | 92651            | 80251            | 19749                 | 07349          | 27098                  | 36       |
| 25       | 72922            | 92648            | 80279            | 19721                 | 07357          | 27078                  | 35       |
| 26       | 72942            | 92635            | 80307            | 19693                 | 07365          | 27058                  | 34       |
| 27       | 72962            | 92627            | 80335            | 19665                 | 07373          | 27038                  | 33       |
| 28       | 72982            | 92619            | 80363            | 19637                 | 07381          | 27018                  | 32       |
| 29       | 73002            | 92611            | 80391            | 19609                 | 07389          | 26998                  | 31       |
| 30       | 9.73022          | 9.92603          | 9.80419          | 10.19581              | 10.07397       | 10.26978               | 30       |
| 31       | 73041            | 92595            | 80447            | 19553                 | 07405          | 26959                  | 29       |
| 32       | 73061            | 92587            | 80474            | 19526                 | 07413          | 26939                  | 28       |
| 33       | 73081            | 92579            | 80502            | 19498                 | 07421          | 26919                  | 27       |
| 34       | 73101            | 92571            | 80530            | 19470                 | 07429          | 26899                  | 26       |
| 35       | 73121            | 92563            | 80558            | 19442                 | 07437          | 26879                  | 25       |
| . 36     | 73140            | 92555            | 80586            | 19414                 | 07445          | 26860                  | 24       |
| 37       | 73160            | 92546            | 80614            | 19386                 | 07454          | 26840                  | 23       |
| 38       | 73180            | 92538            | 80642            | 19358                 | 07462          | 26820                  | 22       |
| 39       | 73200            | 92530            | 80669            | 19831                 | 07470          | 26800                  | 21       |
| • 40     | 9.73219          | 9.92522          | 9.80697          | 10.19303              | 10.07478       | 10.26781               | 20       |
| 41       | 73239            | 92514            | 80725            | 19275                 | 07486          | 26761                  | 19       |
| 42       | 73259            | 92506            | 80753            | 19247                 | 07494          | 26741                  | 18       |
| 43       | 73278            | 92498            | 80781            | 19219                 | 07502          | 26722                  | 17       |
| 44       | 73298            | 92490            | 80808<br>80836   | 10192                 | 07510          | 26702<br>26689         | 16<br>15 |
| 45       | 79318            | 92482            |                  | 19154                 | 07518          | 26682<br>26663         | 14       |
| 46<br>47 | 73337            | 92473            | 80364            | 19136                 | 07527          | 26663<br>9664          | 13       |
| 48       | 73357            | 92465            | 80892            | 19108                 | 07595          | 2664 <b>3</b><br>26623 | 12       |
| 48       | 73377<br>73396   | 92457<br>92449   | 80919<br>80947   | 19081<br>19053        | 07548<br>07551 | 26604                  | 11       |
|          |                  |                  |                  | 10.19025              | 10.07559       | 10.26584               | 10       |
| 50<br>51 | 9.73416<br>73435 | 9.92441<br>92433 | 9.80975<br>81003 | 18997                 | 07567          | 26565                  | 9        |
| 52       | · 73455          | 92435            | 81030            |                       | I              | 26545                  | 8        |
| 53       | 73474            |                  | 81058            | 18970                 | 07575          | 26526                  | 7        |
| 54       | 73494            | 92416<br>92408   |                  | 18942                 | 07584<br>07592 | 2650 <b>6</b>          | 6        |
| 55       | 73513            | 92400            | 81086<br>81113   | 18914<br>18867        | 07600          | 26487                  | 5        |
| 56       | 73523            | 92592<br>92592   | 81141            | 18859                 | 07608          | 26467                  | 4        |
| 57       | 73552            | 92392<br>92384   | 81169            | 18831                 | 07616          | 26448                  | 3        |
| 58       | 73572<br>73572   | 92376            | 81196            | 18804                 | 07624          | 26428                  | 2        |
| 59       | 73591            | 92376<br>92367   | 81224            | 18776                 | 07633          | 26409                  | î        |
| 60       | 73611            | 92359            | 81252            | 18748                 | 07641          | 26389                  | ô        |
|          | Co-sine.         | Sine.            | l <del></del>    | Tangent.              | Co-secant.     | Secant.                | M.       |
|          |                  | 1 Diffe.         | Co-tangent.      | grees.                | 1 CO-secanii   | , occani.              |          |
| '        |                  |                  | יע זיט           | 0.000                 |                |                        | ٠        |

| ľ        |                    |                                  |                        | LE XI.            | ND 0504N          | ria .               | 67           |
|----------|--------------------|----------------------------------|------------------------|-------------------|-------------------|---------------------|--------------|
|          | <del>-</del>       | OGARITHM                         |                        | ANGENTS, A        | IND SECAN         | 15.                 | <del>,</del> |
| M        | Sine.              | Co-sine.                         | Tangent.               | Co-tangent.       | Secant.           | Co-secant.          |              |
|          | 9.73611            |                                  |                        | <u> </u>          |                   | 10 . 26389          |              |
| ĭ        | 73630              | <b>9.92</b> 359<br><b>92</b> 351 | 9.81252<br>81279       | 10.18748<br>18721 | 10.07641<br>07649 | 26370               | 60<br>59     |
| 2        | 78650              | 92343                            | 81307                  | 18693             | 07657             | 26350               | 58           |
| 3        | 78669              | 92334                            | 81335                  | 18665             | 07666             | 26331               | 57           |
| 4        | 73689              | 92326                            | 81362                  | 18638             | 07574             | 26311               | 56           |
| 5        | 73708              | 92318                            | 81390                  | 18610             | 07682             | 26292               | 55           |
| 6        | · 73727            | 92310                            | 81418                  | 18582             | 07690             | 26273               | 54           |
| 7        | 73747              | 92302                            | 81445                  | 18555             | 07698             | 26253               | 53           |
| 8        | 73766              | 92293                            | 81473                  | 18527             | 07707             | 26234               | 52           |
| 9        | 73785              | 92285                            | 81500                  | 18500             | 07715             | 26215               | 151          |
| 10       | 9.73805            | 9.92277                          | 9.81528                | 10.18472          | 10.07723          | 10.26195            | 50           |
| 11       | . 73824            | 92269                            | 81 <i>5</i> 56         | 18444             | 07731             | 26176               | 49           |
| 12       | 73843              | 92260                            | 81583                  | 18417             | 07740             | 26157               | 48           |
| 13       | 78863              | 92253                            | 81611                  | 18389             | 07748             | 26137               | 47           |
| 14       | 73882              | 92244                            | 81638                  | 18362             | 07756             | 26118               | 46           |
| 15       | 73901              | 92235                            | 81666                  | 18384             | 07765             | 26099               | 45           |
| 16       | 73921              | 92227                            | 81693                  | 18307             | 07773             | 26079               | 44           |
| 17       | 73940              | 92219                            | 81721                  | 18279             | 07781             | 26060               | 43           |
| 18       | 73959              | 92211                            | 81748                  | 18252             | 07789             | 26041               | 42           |
| 19       | 73978              | 92202                            | 81776                  | 18224             | 07798             | 26022               | 41           |
| 20       | 9 . 73997          | 9 · 92194                        | 9.81803                | 10.18197          | 10.07806          | 10.26003            | 40           |
| 21       | 74017              | 92186                            | 81831                  | 18169             | 07814             | 25983               | . 39         |
| 22       | 74036              | 92177                            | 81858                  | 18142             | 07823             | 25964               | 58           |
| 23       | 74055              | 92169                            | 81886                  | 18114             | 07831             | 25945               | 37           |
| 24       | 74074              | 92161                            | 81913                  | 18087             | 07839             | 25926               | 36           |
| 25       | 74093              | 92152                            | 81941                  | 18059             | 07848             | 25907               | 35           |
| 26       | 74113              | 92144                            | 81968                  | 18032             | 07856             | 25887               | 34           |
| 27       | 74132              | 92136                            | 81996                  | 18004             | 07864             | 25868               | 33           |
| 28       | 74151              | 92127                            | 82023                  | 17977             | 07873             | 25849               | 32           |
| 29       | 74170              | 92119                            | <b>82</b> 051          | 17949             | `07881            | <b>25</b> 830       | 31           |
| 30       | 9.74189            | 9.92111                          | 9.82073                | 10.17922          | 10.07889          | 10.25811            | 30           |
| 31       | 74208              | .92102                           | 82106                  | 17894             | 07898             | 25792               | 29           |
| 32       | 74227              | 92094                            | 82133                  | 17867             | 07906             | 25773               | 28           |
| 33       | 74245              | 92086                            | 82161                  | 17839             | 07914             | 2575 <del>4</del>   | 247          |
| 34       | 7,4265             | 92077                            | 82188                  | 17812             | 07923             | 25735               | 26           |
| 35       | 74284              | 92069                            | √8221 <i>5</i>         | 17785             | · Q7981           | 25716               | 25           |
| 36       | 74303              | 92060                            | 82243                  | 17757             | 07940             | 25697               | 24           |
| 37       | 74322              | 92052                            | 82270                  | 17780             | 07948             | <b>2</b> 5678       | 23           |
| 38       | 74841              | 92044                            | 82298                  | 17702             | 07956             | 25659               | 22           |
| 39       | 74360              | 92035                            | 82325                  | 17675             | 07965             | 25640               | 21           |
| 40       | 9.74379            | 9.92027                          | 9.82352                | 10.17648          | 10.07973          | 10 . 25621          | 20           |
| 41       | 74398              | 92018                            | 82380                  | 17620             | 07982             | 25602               | 19           |
| 42       | 74417              | 92010                            | 82407                  | 17598             | 07990             | 25585               | 18           |
| 43       | 7 <del>44</del> 36 | 92002                            | 8 <b>24</b> 3 <b>5</b> | 17565             | 07998             | 25564               | 17           |
| 44       | 74455              | 91998                            | 82462                  | 17538             | 08007             | 25545               | 16           |
| 45       | 74474              | 91985                            | 82489                  | 17511             | 08015             | 25526               | 15           |
| 46       | 7 <b>44</b> 93     | 91976                            | 82517                  | 17483             | 08024             | 25507               | 14           |
| 47       | 74512              | 91368                            | 82544                  | 17456             | 08092             | 25488               | 13           |
| 48<br>49 | 74531<br>74549     | 91959<br>91951                   | 82571<br>82599         | 17429·<br>17401   | 08041<br>'08049   | 25469<br>25451      | 12           |
| 50       |                    |                                  | 9.82626                | ļ                 |                   |                     |              |
| 51       | 9.74568<br>74587   | 9.91942<br>91934                 | 82653                  | 1017974           | 10.08058<br>08066 | 10 , 25432<br>25413 | 10           |
| 52       | 74606              | 91925                            | 82681                  | 17319             | 08075             | 25394               | 8            |
| 53       | 74625              | 91917                            | 82708                  | 17292             | 08083             | 25375               | 7            |
| 54       | 74644              | 91903                            | 82735                  | 17265             | 08092             | 25356               | 6            |
| 55       | 74662              | 91900                            | 82762                  | 17238             | 08100             | 25338               | 5            |
| 56       | 74681              | 91891                            | 82790                  | 17210             | 08109             | 25319               | 4            |
| 57       | 74700              | 91883                            | 82817                  | 17183             | 08117             | 25300               | s            |
| 58       | 74719              | 91874                            | 82844                  | 17156             | 08126             | 25281               | 2            |
| 59       | 74787              | 91866                            | 82871                  | 17129             | 08134             | 25263               | 1            |
| 60       | 74756              | 91857                            | 82899                  | 17101             | 08143             | 25244               | Ō,           |
|          | Co-sine.           | Sine.                            | Co-tangent.            | Tangent.          | Co-secant.        | Secant.             | M.           |
| ł        |                    | ·                                |                        | ATTAAD            |                   | ·                   | 1            |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|          | S4 Degrees.                            |                                 |                        |                        |                        |                        |          |
|----------|--|---------------------------------|------------------------|------------------------|------------------------|------------------------|----------|
| M.       | Sine.                                  | Co-sine.                        | Tangent.               | Co-tangent.            | Secant.                | Co-secant.             |          |
| 0        | 9.74756                                | 9.91857                         | 9.82893                | 10.17101               | 10.08143               | 10.25244               | 60       |
| 1        | 74775                                  | 91849                           | 82926                  | 17074                  | 08151                  | 25225                  | 59       |
| 2        | 74791                                  | 91849                           | 82953                  | 17047                  | 08160                  | 25206                  | 58<br>57 |
| 4        | 74812<br>74831                         | 91832                           | 8298)                  | 17023                  | 08168                  | 25188<br>25169         | 56       |
| 5        | 74850                                  | 91828<br>91815                  | 83008<br>83035         | 16992<br>16965         | 08177<br>08185         | 25159<br>25150         | 55       |
| 6        | 74868                                  | 91806                           | 3062                   | 16938                  | 08194                  | 25132                  | 54       |
| 7        | 74887                                  | 91798                           | 83389                  | 16911                  | 08202                  | . 25113                | 53       |
| 8        | 74906                                  | 91789                           | 83117                  | 16883                  | 08211                  | 25094                  | 52       |
| 9        | 74924                                  | 91781                           | 83144                  | 16856                  | 08219                  | 25076                  | 51       |
| 10       | 9.74948                                | 9.91772                         | 9.83171                | 10.16829               | 10.08228               | 10 . 25057             | 50       |
| 11       | 74961                                  | 91763                           | 83198                  | 16802                  | 08237                  | 25039                  | 49       |
| 12<br>13 | 74980                                  | 91755                           | 83225                  | 16775                  | 08245<br>08254         | 25020<br>25001         | 48<br>47 |
| 14       | 749 <del>9</del> 9<br>· 7 <i>5</i> 017 | 91746<br>91738                  | 83252<br>83280         | 16748<br>16720         | 08269                  | 24983                  | 46       |
| 15       | 75036                                  | 91729                           | 83307                  | 16693                  | 08271                  | 21964                  | 45       |
| 16       | 75054                                  | 91720                           | 83334                  | 16666                  | 08280                  | 24946                  | 44       |
| 17       | 75073                                  | 91712                           | 89361                  | 16639                  | 08288                  | 24927                  | 43       |
| 18       | 7 <i>5</i> 091                         | 91703                           | 83368                  | 16612                  | 08297                  | 24909                  | 42       |
| 19       | 75110                                  | 91695                           | 83415                  | 16585                  | 08305                  | 24890                  | 41       |
| 20       | 9.75128                                | 9.91686                         | 9 . 83442              | 10 . 16558             | 10.08314               | 10.25872               | 40       |
| 21       | 75147                                  | 91677                           | 83470                  | 16530                  | 08323                  | 24853                  | 89       |
| 22<br>23 | 75165                                  | 91669                           | 83497                  | 16503                  | 08331                  | 24835                  | 38<br>37 |
| 24       | 75184<br>75902                         | 91660<br>91651                  | 835 <u>24</u><br>83551 | 16476<br>16449         | 08340<br>08349         | 24816<br>24798         | 36       |
| 25       | 75221                                  | 91643                           | 83378                  | 16422                  | 08357                  | 24779                  | 35       |
| 26       | 75239                                  | 91634                           | 83605                  | 16395                  | 08366                  | 24761                  | 34       |
| 27       | 75258                                  | 91625                           | 83632                  | 16368                  | 08375                  | 24742                  | 53       |
| 28       | <b>75</b> 276                          | 91617                           | 83659                  | 16341                  | 08383                  | 24724                  | 32       |
| 29       | 75294                                  | 91608                           | 83686                  | 16314                  | 08392                  | 24706                  | 31       |
| 30       | 9.75313                                | 9.91599                         | 9.83713                | 10 . 16287             | 10.08401               | 19.24687               | 30       |
| 31       | 75331                                  | 91591                           | 83740                  | 16260                  | 08409                  | 24669                  | 29       |
| 92<br>33 | 75350                                  | 91582                           | 83768                  | 16232                  | 08418                  | 24650                  | 28       |
| 84       | 75368<br>75886                         | 91573<br>91565                  | 8379 <i>5</i><br>83822 | 1620 <b>5</b><br>16178 | 08427<br>0843 <i>5</i> | 24632<br>24614         | 27<br>26 |
| 35       | 75405                                  | 91556                           | 83849                  | 16151                  | 08444                  | 24595                  | 25       |
| 36       | 75423                                  | 91547                           | 83976                  | 16124                  | 08453                  | 24577                  | 24       |
| 37       | 75441                                  | 91538                           | 83903                  | 16097                  | 08462                  | 24559                  | 23       |
| 98       | 75459                                  | 915 <b>30</b>                   | 83930                  | 16070                  | 08470                  | 24541                  | 22       |
| 39       | 75478                                  | 91521                           | 83957                  | 16043                  | 08479                  | 24522                  | 21       |
| 40       | 9.75496                                | 9.91512                         | 9 . 83984              | 10.16016               | 10.08488               | 10 . 24504             | 20       |
| 41       | 75514                                  | 91504                           | 84011                  | 15989                  | 08496                  | 24486                  | 19       |
| 42<br>43 | 7 <b>5533</b><br>75551                 | 91495                           | 84038                  | 15962                  | 08505                  | 2:1467                 | 18<br>17 |
| 44       | 75569                                  | 91486<br>91477                  | 84065<br>84092         | 15935<br>15908         | 08514<br>08523         | 24449<br>24431         | 16       |
| 45       | 75587                                  | 91469                           | 84119                  | 15881                  | 08531                  | 24413                  | 15       |
| 46       | 75605                                  | 91460                           | 84146                  | 15854                  | 08540                  | 24395                  | 14       |
| 47       | 75624                                  | 91451                           | 84173                  | 15827                  | 08549                  | 24376                  | 13       |
| 48       | 75642                                  | 91442                           | <b>84</b> 20 <b>0</b>  | 15300                  | 08558                  | 24358                  | 12       |
| 49       | 75660                                  | 91483                           | 84227                  | 15773                  | 08567                  | 24340                  | 11       |
| 50       | 9 . 75678                              | 9.91425                         | 9.84254                | 10.15746               | 10.08575               | 10.24322               | 10       |
| 51       | 75696                                  | 91416                           | 84280                  | 15720                  | 08584                  | 24304                  | 9        |
| 52<br>53 | 75714                                  | 91407                           | 84307                  | 15693                  | 08593                  | 24286                  | 8        |
| 55<br>54 | 7578 <b>3</b><br><b>7</b> 5751         | 91598<br>G1489                  | 84334<br>84361         | 15666                  | 08602                  | 24257                  | 7        |
| 55       | 75769                                  | 913 <b>8</b> 9<br><b>9</b> 1381 | 84361<br>84388         | 15639<br>15612         | 08611<br><b>0</b> 8619 | 2424 <b>9</b><br>24231 | 6 5      |
| 56       | 75787                                  | 91372                           | 84415                  | 15585                  | 08628                  | 24231<br>2421 <b>3</b> | 4        |
| 57       | 75805                                  | 91363                           | 81442                  | 15558                  | 08637                  | 24195                  | 3        |
| 58       | 75823                                  | 91351                           | 84469                  | 15531                  | Q8646                  | 24177                  | 2        |
| 59       | 75841                                  | 91345                           | <b>844</b> 96          | 1.5504                 | 08655                  | 24159                  | 1        |
| 60       | 75859                                  | 91833                           | 84523                  | 15477                  | 08664                  | 24141                  | 0        |
|          | Co-sine.                               | Sine.                           | Co-tangent.            | Tangent.               | Co-secant.             | Secant.                | M.       |
|          |  |                                 | 55 De                  | grees.                 |                        |                        |          |

TABLE XI. LOGARITHMIC SINES, TANGENTS, AND SECANTS.

| <del></del> |                        | COLLECT TIME   | ic bixin, i    |                | TID DECIMA                 | · ~•                  |            |
|-------------|------------------------|----------------|----------------|----------------|----------------------------|-----------------------|------------|
|             | _                      |                | 85 De          | grees.         |                            |                       | i -        |
| M.          | Sine.                  | Co-sine.       | Tangent.       | Co-tangent.    | Secant.                    | Co-secant.            |            |
| 0           | 9.75859                | 9.91336        | 9.84523        | 10.15477       | 10.08664                   | 10.24141              | 60         |
| 1           | 75877                  | 91328          | 84550          | 15450          | 08672                      | 24123                 | 59         |
| 2           | 7589 <b>5</b>          | 91319          | 84576          | 1549:          | 03681                      | 24105                 | <i>5</i> 8 |
| 8           | 75913                  | 91310          | 84503          | 15397          | 08690                      | 24087                 | 57         |
| 4           | 75931                  | 91901          | 84630          | 15370          | 08699                      | 24069                 | 56         |
| 5           | 7594 <b>9</b>          | 91292          | 84657          | 15343          | 08708                      | 24051                 | 55         |
| 6           | 75967                  | 91283          | 84684          | 15316          | 08717                      | 24033                 | 54         |
| 7           | 75985                  | 91274          | 84711          | 15289          | 08726                      | 24015                 | 58         |
| 8           | 76009                  | 91266          | 84738          | 15262          | 08734                      | 23997                 | 52         |
| 9           | 76021                  | 91257          | 84764          | 15236          | 08749 \                    | 23979                 | 51         |
| 10          | 9.76039                | 9.91248        | 9.84791        | 10.15209       | 10.08752                   | 10 . 23961            | 50         |
| 11          | 76057                  | 91239          | 84818          | 15182          | 08761                      | 23943                 | 49         |
| 12          | 76075                  | 91230          | 84845          | 15155          | 08770                      | 23925                 | 48         |
| 13          | 76093                  | 91221          | 84872          | 15128          | 08779                      | 23907                 | 47         |
| 14          | 76111                  | 91212          | 84899          | 15101          | 08788                      | 23889                 | 46         |
| 15          | 76129                  | 91203          | 84925          | 15075          | 08797                      | 23871                 | 45         |
| 16          | 76146                  | 91194          |                |                | 08806                      | 23854                 |            |
| 17          |                        |                | 84952          | 15048          | 08815                      | 23836                 | 44         |
|             | 76164                  | 91185          | 84979          | 15021          |                            |                       | 43         |
| 18          | 76182                  | 91176          | 85006          | 14994          | 08824                      | 23818                 | 42         |
| 19          | 76200                  | 91167          | 85083          | 14967          | 08833                      | 23800                 | 41         |
| 20          | 9.76218                | 9.91158        | 9.85059        | 10.14941       | 10.08842                   | 10.23782              | 40         |
| 21          | 76236                  | 91149          | 85086          | 14914          | 08851                      | 23764                 | 39         |
| 22          | 76253                  | 91141          | 85118          | 14887          | 08859                      | 23747                 | 38         |
| 23          | 76271                  | <b>9</b> 1132  | 85140          | 14860          | 08868                      | 23729                 | 37         |
| 24          | 76289                  | 91123          | 85166          | 14834          | 08877                      | 23711                 | 36         |
| 25          | 76307                  | 91114          | 85193          | 14807          | 08896                      | 23693                 | 35         |
| 26          | 76324                  | 91105          | 85220          | 14780          | 08895                      | 23676                 | 34         |
| 27          | 76342                  | 91096          | 85247          | 147.53         | 08904                      | 23658                 | 33         |
| 28          | 76360                  | 91087          | 85278          | 14727          | 08913                      | 23640                 | 32         |
| 29          | 76378                  | 91078          | 85300          | 14700          | 08922                      | 23622                 | Sl         |
| 30          | 9.76395                | 9.91069        | 9 . 85327      | 10.14673       | 10.08931                   | 10.23605              | 30         |
| 31          | 76413                  | 91060          | 85354          | 14646          | 08940                      | 23587                 | 29         |
| 32          | 76491                  | 91051          | 85380          | 14623          | 08949                      | 28569                 | 28         |
| 33          | 76448                  | 91042          | 85407          | 14593          | 08958                      | 23552                 | 27         |
| 34          | 76466                  | 91033          | 85434          | 14566          | 08967                      | 23534                 | 26         |
| 35          | 76484                  | 91023          | 85460          | 14540          | 08977                      | 23516                 | 25         |
| 36          | 76501                  | 91014          | 85487          |                | 08936                      | 23499                 | 24         |
|             |                        |                |                | 14518          |                            | 23481                 | 1          |
| 37          | 76519                  | 91005          | 85514          | 14486          | 08995                      |                       | 28         |
| 38<br>39    | 76587<br>7655 <b>4</b> | 9J996<br>90987 | 85540<br>85567 | 14460<br>14433 | 0900 <del>1</del><br>09013 | 23463<br>23446        | 22<br>21   |
|             |                        | <u> </u>       | <del></del>    |                |                            |                       |            |
| 40          | 9.76572                | 9.90978        | 9.85594        | 10.14436       | 10.09022                   | 10 . 23428            | 20         |
| 41          | 76590                  | 90969          | 85620          | 14380          | 09031                      | 23410                 | 19         |
| 42          | 76607                  | 90960          | 85647          | 14353          | 09040                      | 23393                 | 18         |
| 43          | 76625                  | 90951          | 85674          | 14326          | 09049                      | 23375                 | 17         |
| 44          | 76642                  | 90942          | 85700          | 14300          | 09058                      | 23358                 | 16         |
| 45          | 76660                  | 90933          | 85727          | 14273          | 09067                      | 23340                 | 15         |
| 46          | .76677                 | 90924          | 85754          | 14246          | 09076                      | 23323                 | 14         |
| 47          | 76695                  | 90915          | 85780          | 14220          | 09085                      | <b>2</b> 330 <b>5</b> | 13         |
| 48          | 76712                  | 90905          | 85807          | 14193          | 09095                      | 23288                 | 12         |
| 49          | 76730                  | 90896          | 85834          | 14166          | 0910 <del>4</del>          | 23270                 | 11         |
| 50          | 9.76747                | 9 . 90887      | 9.85830        | 10.14140       | 10.09113                   | 10.23253              | 10         |
| 51          | 76765                  | 90878          | 85387          | 14113          | 09122                      | 23235                 | 9          |
| 52          | 76782                  | 90869          | 85913          | 14)87          | 09181                      | 23218                 | 8          |
| 58          | 76800                  | 90860          | 85940          | 14030          | 09140                      | 23200                 | 7          |
| 54          | 76817                  | 90851          | 85967          | 14033          | 09149                      | 23183                 | 6          |
| 55          | 76835                  | 90842          | 85993          | 14007          | 09158                      | 23165                 | 5          |
| 56          | 76852                  | 90832          | 86020          | 13980          | 09168                      | 23148                 | 4          |
| 57          | 76870                  | 90323          | 86046          | 13954          | 09177                      | 28130                 | 3          |
| 58          | 76887                  | 90814          | 86073          | 13934          | 09186                      | 23118                 | 2          |
| 59          | 76904                  | 90805          | 86100          | 13927          | 09195                      | 23713                 | î          |
| 60          | 76922                  | 90796          | 86126          | 13874          | 09193                      | 23078                 | ō          |
|             | <del></del>            |                |                |                |                            |                       | M.         |
| 1           | Co-sine.               | ı sine.        | Co-tangent.    | Tangent.       | Co-secant.                 | Secant.               | 144.       |

TABLE XI.

LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|          | 36 Degrees.               |                |                            |                              |                         |                        |          |
|----------|---------------------------|----------------|----------------------------|------------------------------|-------------------------|------------------------|----------|
| M.       | Sine.                     | Co-sine.       | Tangent.                   | Co-tangent.                  | Secant.                 | Co-secant.             | -        |
| 0        | 9.76922                   | 9.90796        | 9.86126                    | 10.13874                     | 10.092)4                | 10 . 23078             | 60       |
| 1        | 76089                     | 90787          | . 86153                    | 13847                        | 09213                   | 23061                  | 59       |
| 2        | 76957                     | 93777          | 86179                      | 13921                        | 09223                   | 23043                  | 58       |
| 3        | 76974                     | 90768          | 86206                      | 13794                        | 09232                   | 23026                  | 57       |
| 4        | 76991                     | 90759          | 86232                      | 13768                        | 09241                   | 23009                  | 56       |
| 5        | 77009                     | 90750          | 86239                      | 13741                        | 09250                   | 22991                  | 55       |
| 6        | 77026                     | 90741          | 86285                      | 13715                        | 09259                   | 22974                  | 54       |
| 7        | 77043                     | 90731          | 86312                      | 13688                        | 09269                   | 22957                  | 53       |
| 8        | 77061                     | 90722          | 86338                      | 13662                        | 09278                   | 22939                  | 52       |
| 9        | 77078                     | 90713          | 86365                      | 13635                        | 09287                   | 22922                  | 51       |
| 10       | 9.77095                   | 9.90704        | 9.86392                    | 10.13608                     | 10.09296                | 10.22905               | 50       |
| 11       | 77112                     | 90694          | 86418                      | 13582                        | 09306                   | 22888                  | 49       |
| 12       | 77130                     | 90685          | 86445<br>96471             | 13555                        | 09315                   | 22870                  | 48       |
| 13<br>14 | 77147                     | 90676          | 86471                      | 13529                        | 09324                   | 22853                  | 47       |
| 15       | 77164                     | 90667          | 86498<br>96504             | 13502                        | 09393                   | 22836                  | 45       |
| 16       | 77181<br>77199            | 90657          | 86524<br>86551             | 13476<br>13449               | 09343<br>098 <i>5</i> 2 | 22819<br>22801         | 44       |
| 17       | 77216                     | 90648<br>90639 | 86377                      | 13423                        | 09361                   | 22784                  | 43       |
| 18       | 77233                     | 90630          | <b>86</b> 603              | 15397                        | 09370                   | 22767                  | 42       |
| 19       | 77250                     | 90620          | 86630                      | 13370                        | . 09380                 | 22750                  | 41       |
| l        |                           |                |                            |                              |                         |                        |          |
| 20<br>21 | 9.77268<br>77285          | 9.90611        | 9.86656<br>86683           | 10 . 18844<br>18 <b>3</b> 17 | 10.09389<br>09898       | 10.22732<br>22715      | 40<br>39 |
| 22       | 77802                     | 90592          | 86709                      | 13291                        | 09408                   | 22698                  | 38       |
| 23       | 77319                     | 90583          | 86736                      | 13264                        | 09417                   | 22681                  | 37       |
| 24       | 77336                     | 90574          | 86762                      | 13238                        | 09426                   | 22664                  | 36       |
| 25       | 77353                     | 90565          | 86789                      | 13211                        | 09435                   | 22647                  | 35       |
| 26       | 77370                     | 90555          | 86815                      | 13185                        | 09445                   | 22630                  | 34       |
| 27       | 77387                     | 90546          | 86842                      | 13158                        | 09454                   | 22613                  | 33       |
| 28       | 77405                     | 90537          | 86868                      | 13132                        | 09463                   | 22595                  | 32       |
| 29       | 77422                     | 90527          | 86894                      | 13106                        | 09473                   | 22578                  | 31       |
| 30       | 9.77439                   | 9.90518        | 9.86921                    | 10.13079                     | 10.09482                | 10.22561               | 30       |
| 31       | 77456                     | 90509          | 86947                      | 13053                        | 09491                   | 22544                  | 29       |
| 32       | 77473                     | 90499          | 86974                      | 18026                        | 09501                   | 22527                  | 28       |
| 33       | 77490                     | 90490          | 87000                      | 13000                        | 09510                   | 22510 .                | 27       |
| 34       | 77507                     | 90480          | 87027                      | 12973                        | 09520                   | 22493                  | 26       |
| S5       | 77524                     | 90471          | 87053                      | 12947                        | 09529                   | 22476                  | 25       |
| 36<br>37 | 77541                     | 90462          | 87079                      | 12921<br>12894               | 09538                   | 22459                  | 24       |
| 98       | 77.558                    | 90452          | 87106                      | 12968                        | 00548                   | · 22442<br>22425       | 22       |
| 33       | 77575<br>77592            | 90443<br>90434 | 87132<br>87158             | 12842                        | 09557<br>09566          | 22408                  | 21       |
| 40       | 9.77609                   | 9.90424        | 9.87185                    | 10.12815                     | 10.09576                | 10.22391               | 20       |
| 41       | 77626                     | 90415          | 87211                      | 12789                        | 09585                   | 22374                  | 19       |
| 42       | 77643                     | 90405          | 87238                      | 12762                        | 09595                   | 22357                  | 18       |
| 48       | 77660                     | .90896.        | 87264                      | 12736                        | 09604                   | 22340                  | 17       |
| 44       | 77677                     | 93386          | 87290                      | 12710                        | 09614                   | 22323                  | 16       |
| 45       | 77694                     | 90377          | 87317                      | 12688                        | 09623                   | 22306                  | 15       |
| 46       | 77711                     | 90368          | 87343                      | 12657                        | 09632                   | 22289                  | 14       |
| 47       | 77727                     | 90358          | 87369                      | 12631                        | 09642                   | 22272                  | 13       |
| 48       | 77744                     | 90349          | 87396                      | 12604                        | 09351                   | 22256                  | 12       |
| 49       | 77761                     | 93339          | 87422                      | 12578                        | 09661                   | 22239                  | 11       |
| 50       | 9.77778                   | 9 . 90330      | 9.87448                    | 10.12552                     | 10.09670                | 10.22222               | 10       |
| 51       | . 77795                   | 90320          | 87 <del>4</del> 7 <i>5</i> | 12525                        | 09680                   | 22205                  | 9        |
| 52       | 77812                     | 90311          | 87 <i>5</i> 01             | 12499                        | . 09689                 | 22188                  | 8        |
| 53       | 77829                     | 90301          | 87527                      | 12473                        | 09699                   | 22171                  | 7        |
| 54       | 77846                     | 90292          | 87554                      | 12446                        | 09708.                  | 22154                  | 6        |
| 55       | 77862                     | 90282          | 87580                      | 12420                        | 09718                   | 22138                  | 5        |
| - 56     | 77879                     | 90273          | 87606                      | 12394                        | 09727                   | 22121                  | 4        |
| 57       | 77896                     | 90263          | 87633                      | 12367                        | 09737                   | 22104                  | 3        |
| 58       | 77913                     | 90254          | 87659                      | 12341                        | 09746                   | 22087                  | 2        |
| 59       | 77930<br>77 <b>94</b> 6 • | 90244<br>90235 | 87685<br>87711             | 12315<br>12289               | 09756<br>09765          | 22370<br>223 <b>54</b> | 0        |
|          | <u></u>                   |                | <u></u>                    | <del></del>                  |                         | Secant.                | M.       |
| · .      | Co-sine.                  | Sine.          | Co-tangent.                | ***                          | Co-secant.              | 1 occani.              | 1‴       |
|          | •                         |                |                            | O                            | -                       |                        | -        |

|           |                               |                             | 713 A 70 3                            | T W V T                                  |                    |                                      |          |
|-----------|-------------------------------|-----------------------------|---------------------------------------|--|--------------------|--------------------------------------|----------|
| H         | <b>T</b> .                    | በር፣ <i>ለ</i> ይነጥ፣ መ         | · · · · · · · · · · · · · · · · · · · | LE XI.                                   | MIN CECANO         | na .                                 | 71       |
| <b> </b>  | 1,1                           | UGARII HM                   |                                       | egrees.                                  | ND SECANT          | . 3.                                 |          |
| М.        | Sine.                         | Co-sine.                    | Tangent.                              | Co-tangent.                              | Secant.            | Co-secant.                           |          |
| 0         | 9.77946                       |                             |                                       |  |                    |                                      |          |
| 1         | 77963                         | 9.90235<br>90225            | 9.87711<br>87738                      | 10 , 12289<br>12262                      | 10 .09765<br>09775 | 10.22054<br>22037                    | 60<br>59 |
| 2         | 77980                         | 90216                       | 87764                                 | 12236                                    | 09784              | 22020                                | 58       |
| 3         | 77997                         | 90206                       | 87790                                 | 12210                                    | 09794              | 22003                                | 57       |
| 4<br>5    | 78013<br>78030                | 90197                       | 87817                                 | 12133<br>12157                           | 09803              | 21987                                | 56       |
| 6         | 78047                         | 90187<br>90178              | 87843<br>87869                        | 12131                                    | 09813<br>09822     | 21970<br>21953                       | 55<br>54 |
| 7         | 78053                         | 90168                       | 87895                                 | 12105                                    | 09832              | 21937                                | 53       |
| 8         | 78080                         | 90159                       | 87922                                 | 12078                                    | 09841              | 21920                                | 52       |
| 9         | 78097                         | 90149                       | 87948                                 | 12052                                    | .09851             | 21903                                | 51       |
| 10        | 9.78113                       | 9.90139                     | 9.87974                               | 10.12026                                 | 10.09861           | 10 . 21887                           | 50       |
| 11 12     | 781 <b>9</b> 0<br>78147       | 90130<br>90120              | 88000<br>88027                        | 12000<br>11978                           | 09870<br>09880     | 21870<br>21858                       | 49<br>48 |
| 13        | 78163                         | 90111                       | 88053                                 | 11947                                    | 09889              | 21837                                | 47       |
| 14        | 78180                         | 90101                       | 88079                                 | 11921                                    | 09899              | 21820                                | 46       |
| 15        | 78197                         | 90091                       | 88105                                 | 11895                                    | 09909              | 21803                                | 45       |
| 16<br>17  | 78213                         | 90082                       | 88131                                 | 11869                                    | 09918              | 21787                                | 44       |
| 18        | -78230<br>78246               | 90072<br>90063              | 88158<br>88184                        | 11842<br>11816                           | 09928<br>09937     | 21770<br>21754                       | 43<br>42 |
| 19        | 78263                         | 90053                       | 88210                                 | 11790                                    | 09947              | 21737                                | 41       |
| 20        | 9.78280                       | 9.90043                     | 9.89236                               | 10.11764                                 | 10.09957           | 10.21720                             | 40       |
| 21        | 78296                         | 90034                       | 88262                                 | 11738                                    | 09966              | 21704                                | 39       |
| 22<br>23  | 78313                         | 90024                       | 88289                                 | 11711                                    | 09976              | 21687                                | 38       |
| 24        | 78329<br>78846                | 90014<br>90005              | 8831 <i>5</i><br>88341                | 11 <b>6</b> 8 <b>5</b><br>11 <b>6</b> 59 | 09986<br>09995     | 21671<br>21654                       | 37<br>36 |
| 25        | 78362                         | 89995                       | 88367                                 | 11633                                    | 10005              | 21638                                | 35.      |
| 26        | 78379                         | 89985                       | 88393                                 | 11607                                    | 10015              | 21621                                | 34       |
| 27<br>28  | 78395                         | 89976                       | 88120                                 | 11580                                    | 10024              | 21605                                | 33       |
| 29        | 78412<br>78428                | 89966<br>89956              | 88416<br>88472                        | 11554<br>11528                           | 10034<br>10044     | 21588<br>21572                       | 32       |
| 30        |                               | <del></del>                 | <u> </u>                              |  |                    |                                      | <u> </u> |
| 31        | 9.78445<br>78461              | 9.89947<br>89937            | 9.88498<br>88524                      | 10.11502                                 | 10.10053,          | 10 . 21 <i>555</i><br>21 <i>5</i> 39 | 30<br>29 |
| 32        | 78478                         | 89927                       | 88550                                 | 11450                                    | 10073              | 21522                                | 28       |
| 33        | 78494                         | 89918                       | 88576                                 | 11424                                    | 10082              | 21506                                | 27       |
| 34        | 78510                         | 89908                       | 88603                                 | 11397                                    | 10092              | 21490                                | 26       |
| 35        | 78527<br>7854 <b>3</b>        | 89898<br>89888              | 88629                                 | 11371<br>11345                           | 10102              | 21473<br>21457                       | 25<br>24 |
| 37        | 78560                         | 89879                       | 88655<br>83681                        | 11319                                    | 10112<br>10121     | 21440                                | 23       |
| 38        | 78576                         | 89869                       | 88707                                 | 11293                                    | 10131              | 21424                                | 22       |
| 39        | 78592                         | 89859                       | 88733                                 | 11267                                    | 10141              | 21408                                | 21       |
| 40        | 9.78609                       | 9.89849                     | 9 . 88759                             | 10 . 11241                               | 10 . 10151         | 10.21391                             | 20       |
| 41        | 78625                         | 89840                       | 88786                                 | 11214                                    | 10160              | 21875                                | 19       |
| 43        | 78642<br>78658                | 89830<br>89820              | 88812<br>88838                        | 11188<br>11162                           | 10170              | 21358<br>21342                       | 18       |
| 44        | 78674                         | 89810                       | 88864                                 | 11136                                    | 10190              | 21326                                | 16       |
| 45        | 78691                         | 89801                       | 88890                                 | 11110                                    | 10199              | 21309                                | 15       |
| 46        | 78707                         | 89791                       | 88916                                 | 11084                                    | 10209              | 21293                                | 14       |
| 47        | 78725                         | 89781                       | 88942                                 | 11058                                    | 10219              | 21277                                | 13       |
| 49        | <b>7</b> 8739<br><b>78756</b> | 89771<br>89761              | \$8968<br>88994                       | 11032<br>11006                           | 10229<br>10239     | 21261<br>21244                       | 12       |
| 50        | 9.78772                       | 9.89752                     | 9 . 89020                             | 10.10980                                 | 10.10248           | 10.21228                             | 10       |
| 51        | 78788                         | 89742                       | 89046                                 | 10954                                    | 10258              | 21212                                | 9        |
| 52        | 7830 <b>5</b>                 | 89732                       | 89073                                 | 10927                                    | 10268              | 21195                                | 8        |
| 53.<br>54 | 78821                         | 89722                       | 89099                                 | 10901                                    | 10278              | 21179                                | 7        |
| 55        | 78837<br>78853                | 89712 <sup>r</sup><br>89702 | 89125<br>89151                        | 1087 <i>5</i><br>10849                   | 10288<br>10298     | 21163<br>21147                       | 5        |
| 56        | 78869                         | 89693                       | 89177                                 | 10823                                    | 10307              | 21131                                | 4        |
| 57        | 78886                         | <b>8968</b> 3               | 89203                                 | 10797                                    | 10317              | 21114                                | 3        |
| 58<br>59  | 78902                         | 89673                       | 89229                                 | 10771                                    | 10327              | 21098                                | 2        |
| 60        | 78918<br>78934                | 89663<br>89653              | 89255<br>89281                        | 10745                                    | 10337<br>10347     | 21082<br>21066                       | 0        |
| -         | 10904                         | 89653                       | 99201                                 | 10719                                    | 10347              | 21000                                | 1_0      |

Co-sine.

Sine.

52 Degrees.

Co-tangent.

Tangent.

Co-secant.

Secant.

M.

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.
38 Degrees.

|           | 38 Degrees.            |                                |                        |                            |                   |                        |          |  |  |  |  |
|-----------|------------------------|--------------------------------|------------------------|----------------------------|-------------------|------------------------|----------|--|--|--|--|
| M.        | Sine.                  | Co-Sine.                       | Tangent.               | Co-taugent.                | Secant.           | Co-secant.             |          |  |  |  |  |
| 0         | 9.78934                | 9.89653                        | 9.89281                | 10.10719                   | 10.10347          | 10.21066               | 60       |  |  |  |  |
| 1         | : 78950                | 89649                          | 89307                  | 10693                      | 10357             | 21050                  | 59       |  |  |  |  |
| 2         | 78967                  | 89633                          | , 89353                | 10667                      | 10367             | 21033                  | 58       |  |  |  |  |
| 3         | 78983                  | 89624                          | 89359                  | 10641                      | 10376             | 21017                  | 57       |  |  |  |  |
| 4<br>5    | 78999<br>7901 <i>5</i> | 89614<br>89604                 | 89385<br>89411         | 10615<br>10589             | 10386             | 21001<br>20985         | 56<br>55 |  |  |  |  |
| 6         | 79031                  | 89594                          | 89437                  | 10563                      | 10406             | 20969                  | 54       |  |  |  |  |
| 7         | 79017                  | 89584                          | 89463                  | 10537                      | 10416             | 20958                  | 53       |  |  |  |  |
| 8         | 79063                  | 89574                          | 89489                  | 10511                      | 10426             | 20937                  | 52       |  |  |  |  |
| . 9       | 79079                  | 895 <b>64</b>                  | 8951 <b>5</b>          | 10485                      | 10436             | 20921                  | 51       |  |  |  |  |
| 10        | 9.79095                | 9.89554                        | 9.89541                | 10.10459                   | 10.10446          | 10.20905               | 50       |  |  |  |  |
| 11        | 79111                  | 89544                          | 89 <b>5</b> 67         | 10433                      | 10456             | 20889                  | 49       |  |  |  |  |
| 12        | 79128                  | 89534                          | 89593                  | 10407                      | 10466             | 20872                  | 48       |  |  |  |  |
| 13        | 79144                  | 89524                          | 89619                  | 10381                      | 10476             | 20856                  | 47       |  |  |  |  |
| 14        | 79160                  | 89514                          | 89645                  | 10855                      | 10486             | 20840                  | 46       |  |  |  |  |
| 15<br>16  | 79176                  | 89504                          | 89671                  | 10329<br>10303             | 10496<br>10505    | 20824                  | 45<br>44 |  |  |  |  |
| 17.       | 79192<br>79208         | 8949 <i>5</i><br>8948 <i>5</i> | 89697<br>897 <b>23</b> | 10303                      | 10515             | 20808<br>20792         | 49       |  |  |  |  |
| 18        | 79224                  | 89475                          | 89749                  | 10251                      | 10525             | 20776                  | 42       |  |  |  |  |
| 19        | 79240                  | 89465                          | 89775 -                | 10225                      | 10535             | 20760                  | 41       |  |  |  |  |
| 20        | 9.79256                | 9.89455                        | 9.89801                | 10.10199                   | 10.10545          | 10.20744               | 40       |  |  |  |  |
| 21        | 79272                  | 89445                          | 89827                  | 10173                      | 10555             | 20728                  | 39       |  |  |  |  |
| 22        | 79288                  | 89435                          | 89853                  | 10147                      | 10565             | 20712                  | 38       |  |  |  |  |
| 23        | 79304                  | 89425                          | 89879                  | 10121                      | 10575             | 20696                  | 37       |  |  |  |  |
| 24        | 79319                  | 89415                          | 89905                  | 10095                      | 10585             | 20681                  | 36       |  |  |  |  |
| 25        | 79335                  | 89405                          | 89931                  | 10069                      | 10595             | 20665                  | 35       |  |  |  |  |
| 26        | 79851<br>79367         | 8939 <i>5</i><br>8938 <i>5</i> | 89957<br>89983         | 10043<br>10017             | 10605<br>10615    | 20649                  | 34<br>33 |  |  |  |  |
| .27<br>28 | 79383                  | 89375                          | 90009                  | 09991                      | 10615             | 20633<br>20617         | 32       |  |  |  |  |
| 29        | 79399                  | 89364                          | 90035                  | 09965                      | 10636             | 20601                  | 31       |  |  |  |  |
| 30        | 9.79415                | 9.89354                        | 9.90061                | 10.09939                   | 10.10646          |                        | 30       |  |  |  |  |
| 31        | 79431                  | 89344                          | 90086                  | 09914                      | 10656             | 10.20585<br>20569      | 29       |  |  |  |  |
| 32        | 79447                  | 89334                          | 90112                  | 09888                      | 10666             | 20553                  | 28       |  |  |  |  |
| 33        | 79463                  | 89324                          | 90138                  | 09862                      | 10676             | 20537                  | 27       |  |  |  |  |
| 34        | 79478                  | 89314                          | 90164                  | <b>9</b> 9836              | 10686             | 20522                  | 26       |  |  |  |  |
| 35        | 79494                  | 89304                          | 90190                  | 09810                      | 10696             | 20506                  | 25       |  |  |  |  |
| 36        | 79510                  | 89294                          | 90216                  | 09784                      | 10706             | 20490                  | 24<br>23 |  |  |  |  |
| 37<br>38  | 79526<br>79542         | 89284<br>89274                 | 90242<br>90268         | 09758<br>09732             | 10716<br>10726    | 20474<br>20458         | 22       |  |  |  |  |
| 39        | 79558                  | 89264                          | 90294                  | 09706                      | 10736             | 20442                  | 21       |  |  |  |  |
| 40        |                        | 9.89254                        | 9 , 90320              | 10.09680                   | 10.10746          | 10 00407               | 20       |  |  |  |  |
| 41        | 9.79573<br>79589       | 89244                          | 90346                  | 09554                      | 10756             | 10.20427<br>20411      | 19       |  |  |  |  |
| 42        | 79605                  | 89233                          | 90371                  | 09629                      | 10767             | 20395                  | 18       |  |  |  |  |
| 43        | 79621                  | 89223                          | 90397                  | 09603                      | 10777             | 20379                  | 17       |  |  |  |  |
| 44        | 79636                  | 89213                          | 90423                  | 09577                      | 10787             | 20364                  | 16       |  |  |  |  |
| 45        | 79652                  | 89203                          | 90449                  | 09551                      | 10797             | 20348                  | 15       |  |  |  |  |
| 46        | 79668                  | 89193                          | 90475                  | 09525                      | 10807             | 20332                  | 14<br>13 |  |  |  |  |
| 47<br>48  | 79684<br>79699         | 89183<br>89173                 | 90501                  | 09499<br>09473             | 10817<br>10827    | 20316<br>20301         | 12       |  |  |  |  |
| 49        | · 79715                | 89162                          | 90527<br>90553         | 09473                      | 10838             | 20301<br>2028 <i>5</i> | 11       |  |  |  |  |
|           |                        |                                |                        |                            |                   |                        | 10       |  |  |  |  |
| 50<br>51  | 9.79731<br>79746       | 9.89152<br>89142               | 9 · 90578<br>90604     | 10.09422<br>093 <b>9</b> 6 | 10.10848<br>10858 | 10 : 20269<br>20254    | 9        |  |  |  |  |
| 52        | 79762                  | 89132                          | 90630                  | 09370                      | 10868             | 20234                  | 8        |  |  |  |  |
| 53        | 79778                  | 89122                          | 90656                  | 09344                      | 10878             | 20222                  | 7        |  |  |  |  |
| 54        | 79793                  | 89112                          | 90682                  | 09318                      | 10888             | 20207                  | 6        |  |  |  |  |
| 55        | 79809                  | 89101                          | 90708                  | 09292                      | 10899             | 20191                  | 5        |  |  |  |  |
| 56        | 79825                  | 89091                          | 90734                  | 09266                      | 10909             | 20175                  | 4 3      |  |  |  |  |
| 57<br>58  | 79840<br>79856         | 89081<br>89071                 | 90759<br>90785         | 09241<br>09215             | 10919             | 20160<br>20144         | 2        |  |  |  |  |
| 59        | 79872                  | 89060                          | 90811                  | 09189                      | 10940             | 20128                  | ī        |  |  |  |  |
| 60        | 79887                  | 89050                          | 90837                  | 09163                      | 10950             | 20113                  | 0        |  |  |  |  |
|           | Co-sine.               | Sine.                          | Co-tangent.            | Tangent.                   | Co-secant.        | Secant.                | M.       |  |  |  |  |
| .  -      | CO-sine. (             | OINT.                          | 51 De                  |                            | Co-sciant.        | octain.                |          |  |  |  |  |
|           |                        |                                | or De                  | g. ccs.                    | <del></del>       |                        |          |  |  |  |  |
|           |                        |                                |                        |                            |                   |                        |          |  |  |  |  |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.
39 Degrees.

|      |                        |                        | 39 Degrees.             |                        |                         |                         |             |  |  |
|------|------------------------|------------------------|-------------------------|------------------------|-------------------------|-------------------------|-------------|--|--|
| M.   | Sine.                  | Co-sine.               | Tangent.                | Co-tangent.            | Secant.                 | Co-secant.              | -           |  |  |
| -    | 0 70007                | 0.0050                 |                         | 10 00161               | 10 10050                | 10.00110                |             |  |  |
| 0    | 9.79887                | 9,89050                | 9.90837                 | 10.09163               | 10.10950                | 10.20118                | 60<br>59    |  |  |
| 1 9  | 79903                  | 89040                  | 90863                   | 0913 <b>7</b><br>09111 | 10960                   | 20097<br>20082          | <i>5</i> 9  |  |  |
| 8    | , 79918                | 89030                  | 90889                   | 09086                  | 10970                   |                         | 57          |  |  |
| 4    | 79934                  | '- 89020               | 90914                   | 09060                  | 10980                   | 20066<br>20050          | <i>5</i> 6  |  |  |
| 5    | 79950                  | 89009                  | 90940                   | 09034                  | 10991 ·<br>11001        |                         | 55          |  |  |
| 6    | 79965<br>79981         | 89999<br>88989         | 90966                   | 09008                  | 11011                   | 20035<br>20019          | 54          |  |  |
| 7    | 79996                  | 88978                  | 90992<br>91018          | 08982                  | 11022                   | 20019                   | 53          |  |  |
| 8    | 80012                  | 88968                  | 91043,                  | 08957                  | 11022                   | 19988                   | 52          |  |  |
| 9    | 80027                  | 889 <i>5</i> 8         | 91069                   | 08931                  | 11042                   | 19973                   | <i>5</i> 1  |  |  |
|      | 60021                  | 00330                  | 31003                   | 003.71                 | 11042                   | 13313                   | <del></del> |  |  |
| 10   | 9.80043                | 9.88948                | 9.91095                 | 10.08905               | 10.11052                | 10.19957                | <i>5</i> 0  |  |  |
| 11   | 80058                  | 88937                  | 91121                   | 08879                  | 11063                   | 19942                   | 49          |  |  |
| 12   | 80074                  | 88927                  | 91147                   | 08853                  | 11073                   | 19926                   | 48          |  |  |
| 13   | 80089                  | 88917                  | 91172                   | <b>9</b> 8828          | 11033                   | 19911                   | 47          |  |  |
| 14   | 80105                  | 88906                  | 91198                   | 08802                  | 11094                   | 19895                   | .46         |  |  |
| 15   | 80120                  | 88896                  | 91224                   | 08776                  | 11104                   | 19880                   | 45          |  |  |
| 16   | 80136                  | 88886                  | 91250                   | 08750                  | 11114                   | 19864                   | 44          |  |  |
| 17   | 80151                  | 8887 <i>5</i>          | 91276                   | 08724                  | 11125                   | 19849                   | 43          |  |  |
| 18   | 80166                  | 8886 <i>5</i>          | 91301                   | 08699                  | 11135                   | 19834                   | · 42        |  |  |
| 19   | 80182                  | 888 <i>55</i>          | 91327                   | 08673                  | 11145                   | 19818                   | 41          |  |  |
| 20   | 0 00105                | <b>6</b> 00044         | 0.01050                 | 10 00045               | 10 11150                | 10 10000                | 40          |  |  |
| 21   | 9.80197                | 9.88844                | 9.91353                 | 10.08647               | 10.11156                | 10.19803                | 39          |  |  |
| 22   | 80213                  | . 88834                | 91379                   | 08621<br>08596         | 11166                   | 19787                   |             |  |  |
| 23   | 80228<br><b>8</b> 0244 | 88824<br>88813         | 91404                   | 08570                  | 11176<br>11187          | 19772 ´<br>19756        | 38<br>37    |  |  |
| 24   |                        |                        | 91430                   | 08544                  |                         | 19730                   |             |  |  |
| 25   | 80259                  | 88803                  | 91456                   |                        | 11197                   |                         | 36          |  |  |
| 26   | 80274                  | 88793                  | 91482                   | 08518                  | 11207                   | 19 <b>72</b> 6<br>19710 | 35          |  |  |
| 27   | 80290                  | 88782                  | 91507                   | 08493                  | 11218<br>11 <b>2</b> 28 | 19695                   | . 34        |  |  |
| 28   | 80305                  | 88772                  | 91533                   | 08467<br>08441         |                         | 19680                   | 33          |  |  |
| 29   | 80320                  | 88761                  | 91 <i>55</i> 9          | 08415                  | 11239                   | 19664                   | 32          |  |  |
| 29   | 80336                  | 88751                  | 91585                   | 00415                  | 11249                   | 19004                   | 31 •        |  |  |
| 30   | 9.80351                | 9.88741                | 9.91610                 | 10.08390               | 10.11259                | 10.19649                | 30          |  |  |
| 31   | 80366                  | 88730                  | 91656                   | , 08364                | 11270                   | 19634                   | 29          |  |  |
| 32   | 80382                  | 88720                  | 91662                   | ′ <b>08</b> 338        | 11280                   | 19618                   | 28          |  |  |
| 33   | 80397                  | 88709                  | 91688                   | 08312                  | 11291                   | 19603                   | 27          |  |  |
| 34   | 80412                  | 88699                  | 97713                   | 08287                  | 11301                   | 19 <b>588</b>           | 26          |  |  |
| 35   | F0428                  | 88688                  | 91739                   | 08261                  | 11312                   | 19572                   | 25          |  |  |
| 36   | 80443                  | 88678                  | 91765                   | 08235                  | 11322                   | 19557                   | 24          |  |  |
| 37   | 80458                  | 88668                  | 91791                   | 08209                  | 11392                   | 19542                   | 23          |  |  |
| 58   | 80473                  | 88657                  | 91816                   | 08184                  | 11343                   | 19527                   | 22          |  |  |
| 39   | 80489                  | 88647                  | 91842                   | 08158                  | 11353                   | 19511                   | 21          |  |  |
| 40   | 9.80504                | 9.88636                | 0 01069                 | 10.08132               | 10.11964                | 10.19496                | 20          |  |  |
| 41   |                        |                        | 9.91868                 | 08107                  | 11374                   | 19481                   | 19          |  |  |
| 42   | 80519<br>. 80534       | 88626<br>8861 <i>5</i> | 91893                   | 08081                  | 11985                   | 19466                   | 18          |  |  |
| - 43 | 80 <i>55</i> 0         | 88605                  | 91919<br>91 <b>94</b> 5 | 08055                  | 11395                   | 19450                   | 17          |  |  |
| 44   | 80565                  | 88594                  | 91945                   | 08029                  | 11406                   | 19435                   | 16          |  |  |
| 45   | 80580                  | 88584                  | 91996                   | 08004                  | 11416                   | 19420                   | 15          |  |  |
| 46   | 80595                  | 88578                  | 92022                   | 07978                  | 11427                   | 19405                   | 14          |  |  |
| 47   | 80610                  | 88.563                 | 92022                   | 07952                  | 11437                   | 19390                   | 13          |  |  |
| 48   | 80625                  | 88552                  | 92073                   | 07927                  | 11448                   | 19375                   | 12          |  |  |
| 49   | 80641                  | 88542                  | 92099                   | 07901                  | 11458                   | 19359                   | lii         |  |  |
|      |                        | . <del> </del>         | <del> </del>            |                        |                         | <del> </del>            | <u> </u>    |  |  |
| 50   | 9.80656                | 9 . 88591              | 9.92125                 | 10.07875               | 10.11469                | 10.19344                | 10          |  |  |
| 51   | 80671                  | 88521                  | 92150                   | 07850                  | 11479                   | 19329                   | 9           |  |  |
| 52   | 80686                  | 88510                  | 92176                   | 07824                  | 11490                   | 19814                   | 8           |  |  |
| 58   | 80701                  | 88499                  | 92202                   | 07798                  | 11501                   | 19299                   | 7           |  |  |
| 54   | 80716                  | 88489                  | 92227                   | 07773                  | 11511                   | 19284                   | . 6         |  |  |
| 55   | 80731                  | 88478                  | 92253                   | 07747                  | 11522                   | 19269                   | 5           |  |  |
| 56   | 80746                  | 88468                  | 92279                   | 07721                  | 11532                   | 19254                   | 4           |  |  |
| 57   | 80762                  | 88457                  | 92304                   | 07696                  | 11543                   | 19238                   | 3           |  |  |
| 58   | 80777                  | 88447                  | 92330                   | 07670                  | 11 <i>5</i> <b>5</b> 3  | 19223                   | 2           |  |  |
| 59   | 80792                  | 88436                  | 92356                   | 07644                  | 11564                   | 19208                   | 1           |  |  |
| 50   | 80807                  | 88425                  | 92381                   | • 07619                | 11575                   | 19198                   | 10          |  |  |
|      | Co-sine.               | Sine.                  | Co-tangent.             | Tangent.               | Co-secant.              | Secant.                 | M.          |  |  |
| Ił   | 1                      | , orac.                | Corangent               | 1 1 amente             | · CO-scraut.            | Luctante                | _1          |  |  |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|            | 40 Degrees.                     |                            |                        |                        |                   |                     |          |  |  |  |  |
|------------|---------------------------------|----------------------------|------------------------|------------------------|-------------------|---------------------|----------|--|--|--|--|
| M.         | Sine.                           | Co sine.                   | Tangent.               | Co-tangent.            | Secant.           | Co-secant.          |          |  |  |  |  |
| Q          | 9.80807                         | 9.88425                    | 9.92381                | 10.07619               | 10.11575          | 10.19193            | 60       |  |  |  |  |
| 1          | 80622                           | 88415                      | 92407                  | 07593                  | -11585            | 19178               | 59       |  |  |  |  |
| 2          | 80637                           | 88404                      | 92433                  | 07567                  | 11596             | 19163               | 58       |  |  |  |  |
| 3          | 80852                           | 88394                      | 92458                  | 07542                  | 11606             | 19148               | 57       |  |  |  |  |
| 4          | 80867                           | 88383                      | 92484                  | 07516                  | 11617             | 19133               | 56<br>55 |  |  |  |  |
| 5          | 80882                           | 88972                      | 92510                  | 07490                  | 11628             | 19118               | 54<br>54 |  |  |  |  |
| 6          | 80897                           | 88362                      | 92585                  | 07465                  | 11638<br>11649    | 19103               | 53       |  |  |  |  |
| 7          | 80912                           | 88351                      | 92561                  | 07439<br>07413         | 11660             | 19073               | 52       |  |  |  |  |
| . 8        | 80927<br>80942                  | 88840<br>88330             | 92587<br>92612         | 07388                  | 11670             | 19058               | 51       |  |  |  |  |
|            |                                 |                            |                        |                        |                   |                     | 50       |  |  |  |  |
| 10         | 9.80957                         | 9.88319                    | 9.92638                | 10.07362<br>07337      | 10.11681<br>11692 | 10 . 19043<br>19028 | 49       |  |  |  |  |
| 11         | 80972                           | 88908                      | 92663                  | 07311                  | 11702             | 19013               | 48       |  |  |  |  |
| 12         | 80987<br>81000                  | 88298<br>88287             | 92689<br>92715         | 07285                  | 11713             | 18998               | 47       |  |  |  |  |
| 13<br>14   | 81002                           | 88276                      | 92740                  | 07260                  | 11724             | 18983               | 46       |  |  |  |  |
| 15         | 81017<br>81032                  | 88266                      | 92766                  | 07234                  | 11734             | 18968               | 45       |  |  |  |  |
| 16         | 81047                           | 88255                      | 92792                  | 07208                  | 11745             | 18953               | 44       |  |  |  |  |
| . 17       | 81061                           | 88244                      | 92817                  | 07183                  | 11756             | 18939               | 49       |  |  |  |  |
| 18         | 81076                           | 88234                      | 92843                  | 071 <i>5</i> 7         | 11766             | 18924               | 42       |  |  |  |  |
| 19         | 1091ھر                          | 88223                      | 92868                  | 07132                  | 11777             | 18909               | 41       |  |  |  |  |
| 20         | 9.81106                         | 9.88212                    | 9.92894                | 10.07106               | 10.11788          | 10.18894            | 40       |  |  |  |  |
| 21         | 81121                           | 88201                      | 92920                  | 07080                  | 11799             | 18879               | 39       |  |  |  |  |
| 22         | 81136                           | 88191                      | 92945                  | 07055                  | 11809             | 18864               | 38       |  |  |  |  |
| 23         | 81151                           | 88180                      | 92971                  | 07029                  | 11820             | 18849               | 37       |  |  |  |  |
| 24         | 81166                           | 88169                      | 92996                  | 07004                  | 11831             | 18834               | 36<br>35 |  |  |  |  |
| 25         | 81180                           | 881 <i>5</i> 8             | 93022                  | 06978                  | 11842             | 18820<br>18805      | 34       |  |  |  |  |
| 26         | 81195                           | 86148                      | 93048                  | 06952                  | 11852<br>11863    | 18790               | 33       |  |  |  |  |
| 27         | 81210                           | 88137                      | 93073<br>93099         | 06927<br>06901         | 11874             | 18775               | 32       |  |  |  |  |
| 28<br>29   | 81225<br>81240                  | 88126<br>8811 <i>5</i>     | 93124                  | 06876                  | 11885             | 18760               | 81       |  |  |  |  |
|            | <del></del>                     |                            |                        |                        | 10.11895          | 10.18746            | 30       |  |  |  |  |
| 30         | 9.81254                         | 9.88105                    | 9 .93150               | 10.06850               | 11906             | 18731               | 29       |  |  |  |  |
| 31         | 81269                           | 88094                      | 93175                  | 0682 <i>5</i><br>06799 | 11900             | 18716               | 28       |  |  |  |  |
| 32         | 81284                           | 88083<br>88072             | 93201 `<br>93227       | 06773                  | 11928             | 18701               | 27       |  |  |  |  |
| 38<br>34   | 81299<br>81314                  | 88061                      | 93 <b>25</b> 2         | 06748                  | 11939             | 18686               | 26       |  |  |  |  |
| 35         | 81328                           | 88051                      | 93278                  | 06722                  | 11949             | 18672               | 25       |  |  |  |  |
| 36         | 81349                           | 88040                      | 93303                  | 06697                  | 11960             | 18657               | 24       |  |  |  |  |
| .87        | 81358                           | 88029                      | 93529                  | 06671                  | 11971             | 18642               | 23       |  |  |  |  |
| 38         | 81372                           | 88018                      | 93854                  | 0664 <b>6</b>          | 11982             | 18628               | 22<br>21 |  |  |  |  |
| 39         | 81387                           | 88007                      | 93380                  | 06620                  | 11993             | 18613               | .        |  |  |  |  |
| 40         | 9.81402                         | 9.87996                    | 9 . 93406              | 10.06594               | 10.12004          | 10 . 18598          | 20<br>19 |  |  |  |  |
| 41         | 81417                           | 87 <b>98</b> <i>5</i>      | 99431                  | 06569                  | 12015             | 18583               | 18       |  |  |  |  |
| 42         | 81491                           | <b>87</b> 97 <i>5</i>      | 93457                  | 06543                  | 12025             | 18569               | 17       |  |  |  |  |
| 43         | 81446                           | 87964                      | 93482                  | 06518                  | 12036<br>12047    | 18554<br>18539      | 16       |  |  |  |  |
| 44         | 81461                           | 87953                      | 93508<br>93533         | 06492<br>06467         | 12047             | 18525               | 15       |  |  |  |  |
| 45         | 81475                           | 87949<br>87951             | 93559<br>935 <b>59</b> | 06441                  | 12069             | 18510               | 14       |  |  |  |  |
| 46<br>47   | 81490<br>81 <i>5</i> 0 <i>5</i> | 87990                      | 93584<br>93 <b>584</b> | 06416                  | 12080             | 18495               | 13       |  |  |  |  |
| 48         | 81 <i>5</i> 19                  | 87909                      | 93610                  | 06390                  | 12091             | 18481               | 12       |  |  |  |  |
| 49         | 81534                           | 87898                      | 93636                  | 06364                  | 12102             | 18466               | 11       |  |  |  |  |
| <i>5</i> 0 | 9.81549                         | 9.87887                    | 9 . 93661              | 10.06339               | 10.12113          | 10.18451            | 10       |  |  |  |  |
| 51         | 81563                           | 87877                      | 98687                  | 06313                  | 12123             | 18437               | 9        |  |  |  |  |
| 52         | · 81578                         | 87866                      | 99712                  | 06288                  | 1213 <del>4</del> | 18422               | 8        |  |  |  |  |
| 53         | 81592                           | 878 <i>5\$</i>             | 93738                  | 06262                  | 12145             | 18408               | 7        |  |  |  |  |
| 54         | 81607                           | 87844                      | 93763                  | 06237                  | 12156             | 18393               | 6 5      |  |  |  |  |
| 55         | 81622                           | 87883                      | 93789                  | 06211                  | 12167             | 18378               | 4        |  |  |  |  |
| 56         | 81636                           | 87822                      | 93814                  | 06186                  | 12178             | 18364<br>18349      | 3        |  |  |  |  |
| 57         | 81651                           | 87811                      | 93840                  | 06160                  | 12189<br>12200    | 18335               | 2        |  |  |  |  |
| <b>58</b>  | 81665                           | 87800<br>87780             | 93865<br>93891         | 06135<br>06109         | 12200             | 18320               | ī        |  |  |  |  |
| 59<br>60   | 81680<br>81694                  | 87789<br>8777 <del>8</del> | 93916                  | 06084                  | 12222             | 18306               | 0        |  |  |  |  |
|            |                                 |                            |                        |                        |                   |                     | M.       |  |  |  |  |
| 1          | Co-sine.                        | Sine.                      | Co-tangent.            | Tangent.               | Co-secant.        | Secant.             | 1        |  |  |  |  |
| 1          |                                 | _                          | 49 D                   | egrees.                |                   |                     | '        |  |  |  |  |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|          | LOGARITHMIC SINES, TANGENTS, AND SECANTS.   |   |                  |                         |                                |                   |          |  |  |  |  |  |
|----------|---|---|------------------|-------------------------|--------------------------------|-------------------|----------|--|--|--|--|--|
| M.       | Sine.   | Co-sine.  | Tangent.         | Co-tangent.             | Secant.                        | Co-secant.        | · ·      |  |  |  |  |  |
|          |   |   |                  |                         |                                |                   |          |  |  |  |  |  |
| 0        | 9.81694   | 9.87778   | 9.93916          | 10.06084                | 10 . 12222<br>12233            | 10.18306<br>18291 | 60<br>59 |  |  |  |  |  |
| 1 2      | 81709<br>81 <b>72</b> 3   | 8776 <b>7</b><br>877 <i>5</i> 6   | 93942<br>93967   | 06058<br>06033          | 12233                          | 18277             | 58       |  |  |  |  |  |
| 3        | 81738   | 87745   | 93993            | 06007                   | 12255                          | 18969             | 57       |  |  |  |  |  |
| 4        | 81752   | 87734   | 94018            | 05989                   | 12266                          | 18248             | 56       |  |  |  |  |  |
| 5        | 81767   | 87723   | • 94044          | <b>0</b> 59 <b>56</b>   | 12277                          | 18233             | 55       |  |  |  |  |  |
| 6        | 81781   | 87712   | 94069            | 05931                   | 12288                          | 18219             | 54       |  |  |  |  |  |
| 7        | 81796   | 87701   | 94095            | 05905                   | 12299                          | 18204             | 53       |  |  |  |  |  |
| 8        | 81810   | 87690   | 94120            | 05880                   | 12310                          | 18190             | 52       |  |  |  |  |  |
| 9        | 81825   | 87679   | 94146            | 05854                   | 12321                          | 18175             | 51       |  |  |  |  |  |
| 10       | 9.81839   | 9.87668   | 9.94171          | 10.05829                | 10.12332                       | 10.18161          | 50       |  |  |  |  |  |
| 11       | 81854         87657         94197         05803         12943         18146         49           81868         87646         94922         05778         12354         18132         48           81882         87635         94248         05752         12965         18118         47           81897         87624         94273         05727         12376         18103         46           81911         87613         94299         05701         12387         18089         45           81926         87601         94324         05676         12399         18074         44           81940         87590         94350         05650         12410         18060         43           81954         87579         94375         05625         12421         18046         42           81969         87568         94401         05599         12432         18031         41           9 .81983         9 .87557         9 .94426         10 .05574         10 .12443         10 .18017         40           81998         87546         94452         05548         12454         18002         39 |   |                  |                         |                                |                   |          |  |  |  |  |  |
| 12       |   |   |                  |                         |                                |                   |          |  |  |  |  |  |
| 13       |   | 882         87635         94248         05752         12365         1811           897         87624         94273         05727         12376         1810           911         87613         94299         05701         12387         1808           926         87601         94324         05676         12399         1807           940         87590         94350         05650         12410         1806           954         87579         94375         05625         12421         1804           969         87568         94401         05599         12432         1803           983         9.87557         9.94426         10.05574         10.12443         10.1801           998         87546         94452         05548         12454         1800           012         87535         94477         05523         12465         1798           026         87524         94503         05497         12476         1797 |                  |                         |                                |                   |          |  |  |  |  |  |
| 14<br>15 |   |   |                  |                         |                                |                   |          |  |  |  |  |  |
| 16       |   |   |                  |                         |                                |                   | 44       |  |  |  |  |  |
| 17       |   |   |                  |                         |                                |                   | 43       |  |  |  |  |  |
| 18       |   |   | 94375            | 05625                   | 12421                          | 18046             | 42       |  |  |  |  |  |
| 19       | 81969   | 87 <i>5</i> 68  | 94401            | <b>055</b> 99           | 12432                          | 18031             | 41       |  |  |  |  |  |
| 20       |   |   |                  |                         |                                |                   |          |  |  |  |  |  |
| 21       |   |   |                  |                         |                                |                   | 39       |  |  |  |  |  |
| 22       | 82012   |   | 94477            | 05523                   |                                | 17988             | 38       |  |  |  |  |  |
| 23       | 82026   |   |                  |                         |                                | 17974             | 37       |  |  |  |  |  |
| 24       | 82041   | 87513   | 94528            | 05472                   | 12487                          | 17959             | 36       |  |  |  |  |  |
| 25       | 82055   | 87 <i>5</i> 01  | 94554            | 05446                   | 12499                          | 17945             | 85       |  |  |  |  |  |
| 26       | 82069   | 87490   | 94579            | 05421                   | 12510<br>12 <b>52</b> 1        | -17931<br>17916   | 34<br>33 |  |  |  |  |  |
| 27<br>28 | 82084<br>82098  | 87479<br>87468  | 94604<br>94630   | 053 <b>9</b> 6<br>05370 | 12532                          | 17910             | 32       |  |  |  |  |  |
| 29       | 82112   | 87457   | 94655            | 05345                   | 12543                          | 17888             | 31       |  |  |  |  |  |
|          |   |   | 9.94681          | 10 05010                | 10 10554                       | 10.17874          | 30       |  |  |  |  |  |
| 30       | 9.82126<br>82141  | 9.87446<br>87494  | 9.94681<br>94706 | 10 . 05319<br>05294     | 10 125 <b>54</b><br>12566      | 17859             | 29       |  |  |  |  |  |
| 31<br>32 | 82155   | 87423   | 94732            | Q5268                   | 12577                          | 17845             | 28       |  |  |  |  |  |
| 33       | 82169   | 87412   | 94757            | 05243                   | 12588                          | 17831             | 27       |  |  |  |  |  |
| 34       | 82184   | 87401   | 94783            | 05217                   | 12599                          | 17816             | 26       |  |  |  |  |  |
| 35       | 82198   | 87390   | 94808            | 05192                   | 12610                          | 17802             | 25       |  |  |  |  |  |
| 36       | 82212   | 8737 <b>8</b>   | 94834            | 05166                   | 12622                          | 17788             | 24       |  |  |  |  |  |
| 37       | 82226   | 87367   | 9,4859           | 05141                   | 12633                          | 17774             | 23       |  |  |  |  |  |
| 38       | 82240   | 87356°  | 94884<br>94910   | 05116<br>05090          | 126 <b>44</b><br>126 <i>55</i> | 17760<br>17745    | 22<br>21 |  |  |  |  |  |
| 39       | 82255   | 8734 <b>5</b>   |                  |                         |                                |                   |          |  |  |  |  |  |
| 40       | 9.82269   | 9 . 879\$4  | 9,94955          | 10.05065                | 10.12666                       | 10 . 17731        | 20       |  |  |  |  |  |
| 41       | 82283   | 87922   | 94961            | 05039                   | 12678                          | 17717             | 19       |  |  |  |  |  |
| 42       | 82297   | 87911   | 94986            | Q5014                   | 12689<br>12700                 | 17703             | 18<br>17 |  |  |  |  |  |
| 43       | 82311   | 87900   | 95012            | Q4988<br>Q4963          | 12700                          | .17689<br>17674   | 16       |  |  |  |  |  |
| 44<br>45 | 82326<br>82340  | 87288<br>87277  | 95037<br>95062   | 04938                   | 12723                          | 17660             | 15       |  |  |  |  |  |
| 46       | 82354   | 87266   | 95088            | 04912                   | 12734                          | 17646             | 14       |  |  |  |  |  |
| 47       | 82368   | 87255   | 95113            | 04887                   | 12745                          | 17632             | 13       |  |  |  |  |  |
| 48       | 82382   | 87243   | 95139            | 04861                   | 12757                          | 17618             | 12       |  |  |  |  |  |
| 49       | 82396   | 87232   | 95164            | 04836                   | 12768                          | 17604             | 11       |  |  |  |  |  |
| 50       | 9 · 82410   | 9.87221   | 9 . 95190        | 10.04810                | 10.12779                       | 10.17590          | 10       |  |  |  |  |  |
| 51       | 82124   | 87209   | 9,521.5          | 04785                   | 12791                          | 17576             | 9        |  |  |  |  |  |
| 52       | 8 2439  | 87198   | 65240            | 04760                   | 12802                          | 17561             | 8        |  |  |  |  |  |
| 53       | 82453   | 8718 <b>7</b>   | 95266            | 04734                   | 12813                          | 17547             | 7        |  |  |  |  |  |
| 54       | 82467<br>82481  | 87175<br>87164  | 95291<br>95317   | 04709<br>04683          | 12825<br>12836                 | 17533             | 6        |  |  |  |  |  |
| 55       | 17519   | 5   |                  |                         |                                |                   |          |  |  |  |  |  |
| 56<br>57 | 82495   | 871 <i>5</i> 3  | 95342            | 04658                   | 12847                          | 17505             | 4        |  |  |  |  |  |
| 57<br>58 | 82509<br><b>82</b> 523  | 87141<br>87130  | 95368<br>95393   | 04632<br>04607          | 128 <b>39</b><br>12870         | 17491<br>17477    | 3 2      |  |  |  |  |  |
| 59       | 82537   | 87119   | 95418            | 04582                   | 12881                          | 17463             | ī        |  |  |  |  |  |
| 60       | 82551   | 87107   | 95444            | 04556                   | 12893                          | 17449             | ō        |  |  |  |  |  |
|          |   | Sine.   |                  | Tangent.                | Co-secant.                     | Secant.           | M.       |  |  |  |  |  |
|          | Co-sine.  | ome.  | Co-tangent.      |                         | CO-square.                     | , occani,         | 1 av1.   |  |  |  |  |  |
| <u> </u> | 48 Degrees.   |   |                  |                         |                                |                   |          |  |  |  |  |  |

TABLE XI.

LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|  |                               | 42 D                   | egrees.               | <del></del>    | · · · · · · · · · · · · · · · · · · · | 1        |
|--|-------------------------------|------------------------|-----------------------|----------------|---------------------------------------|----------|
| Sine.                                  | Co-tine.                      | ·Tangent.              | Co-tangent.           | Secant.        | Co-secant.                            |          |
| 9 . 82551                              | 9.87107                       | 9 . 95444              | 10.04556              | 10.12895       | 10.17449                              | 60       |
| 82565                                  | 87096                         | 95469                  | 04531                 | 12904          | 17495                                 | 59       |
| 82579                                  | 87085                         | 95495                  | 04505                 | 12915          | 17421                                 | 58       |
| 82 <i>5</i> 93                         | 87073                         | 95520                  | 04480                 | 12927          | 17407                                 | 57       |
| 82607                                  | 87062                         | 95545                  | 04455                 | 12938          | 17393                                 | 56       |
| 82621<br>82635                         | 87050<br>87039                | 95571<br>95596         | 04499<br>04404        | 12950<br>12961 | 17379<br>1736 <i>5</i>                | 55<br>54 |
| 82649                                  | 87028                         | 95622                  | 04378                 | 12972          | 17351                                 | 53       |
| 82663                                  | 87016                         | 95647                  | 04353                 | 12984          | 17337                                 | 52       |
| 82677                                  | 8700 <i>5</i>                 | 95672                  | 04328                 | 12995          | 17323                                 | 51       |
| 9.82691                                | 9.86993                       | 9 . 95698              | 10 . 04802            | 10 . 19007     | 10 . 17509                            | 50       |
| 82705                                  | 86982                         | 95723                  | 04277                 | 13018          | 17295                                 | 49       |
| 82719                                  | 86970                         | 95748                  | 04252                 | 13030          | 17281                                 | 48       |
| 82733                                  | 86959                         | 95774                  | 04226                 | 13041          | 17267                                 | 47       |
| 82747                                  | 86947                         | 95799                  | 04201                 | 13053          | 17253                                 | 40       |
| 82761                                  | 86986                         | 95825                  | 04175                 | 13064          | 17239                                 | 45       |
| 82775                                  | 86924                         | 958,50                 | 04150                 | 13076          | 17225                                 | 44       |
| 82788<br>82802                         | 86913<br>86902                | 9587 <i>5</i><br>95901 | 04125<br>04099        | 13087<br>13098 | 17212<br>17198                        | 43<br>42 |
| 82816                                  | 86890                         | 95926                  | 04074                 | 13110          | 17184                                 | 41       |
| 9.82850                                | 9.86879                       | 9 . 95952              | 10.04048              | 10, 13121      | 10.17170                              | 40       |
| 82844                                  | 86867                         | 95977                  | 04023                 | 13133          | 17156                                 | 39       |
| 82858                                  | 86855                         | 96002                  | 03998                 | 13145          | 17142                                 | 38       |
| 82872                                  | 86844                         | 96028                  | 03972                 | 13156          | 17128                                 | 37       |
| 82885                                  | 86532                         | 96053                  | 03947                 | 13168          | 17115                                 | 36       |
| 82899                                  | 86821                         | 96078                  | 03922                 | 13179          | 17101                                 | 35       |
| 82913                                  | 86809                         | 96104                  | 03996                 | 13191          | 17087                                 | 84       |
| 82927                                  | 86798                         | 96129                  | 03871                 | 13202          | 17073                                 | 83       |
| 82941                                  | <b>8</b> 6786                 | 96155                  | 03845                 | 13214          | 17059                                 | 32       |
| 82955                                  | 86775                         | 96180                  | 03820                 | 13225          | 17045                                 | 31       |
| 9 . 82968                              | 9.86769                       | 9.96205                | 10.03795              | 10.13237       | 10 . 17032                            | 30       |
| 82982                                  | 86752                         | 96231                  | 03769                 | 13248          | 17018                                 | 29       |
| 82996                                  | 86740                         | 96256                  | 03744                 | 13260          | 17004                                 | 28       |
| 83010                                  | 86728                         | 96281                  | 03719                 | 13272          | 16990                                 | 27       |
| 83023                                  | 86717                         | 96307                  | 03693<br>03668        | 13283          | 16977                                 | 26<br>25 |
| 83037<br>83051                         | <b>86705</b><br>8669 <b>4</b> | 96332<br>96357         | 03643                 | 13295<br>13306 | 16963<br>16949                        | 24       |
| 8306 <i>5</i>                          | 86682                         | 96383                  | 03617                 | 13318          | 16935                                 | 23       |
| 83078                                  | 86670                         | 96408                  | 08592                 | 13330          | 16922                                 | 22       |
| 83092                                  | 86659                         | . 96433                | 03567                 | 13341          | 16908                                 | 21       |
| 9.83106                                | 9.86647                       | 9.96459                | 10.03541              | 10.13353       | 10.16894                              | 20       |
| 83120                                  | 86635                         | 96484                  | 03516                 | 13365          | 16880                                 | 19       |
| 83133                                  | 86624                         | 96510                  | 03490                 | 13376          | 16867                                 | 18       |
| 83147                                  | . 86612                       | 96535                  | 03465                 | 13388          | 16853                                 | 17       |
| 83161                                  | 86600                         | 96560                  | 03140                 | 13400          | 16839                                 | 16       |
| 89174                                  | 86589                         | 96586                  | 03414                 | 13411          | 16826                                 | 15       |
| 83188                                  | 86577                         | 96611                  | 03389                 | 13423          | 16812                                 | 14       |
| 83202                                  | 86565                         | 96636                  | 03364                 | 19435          | 16798                                 | 13       |
| <b>8321</b> <i>5</i><br>83 <b>22</b> 9 | 86554<br>86542                | 96662<br>96687         | 03338<br>03313        | 13446<br>13458 | 16785                                 | 12       |
|  | <u>'</u>                      |                        |                       |                |                                       |          |
| 9.83242<br>83256                       | 9 . 86530<br>86518            | 9.96712<br>96733       | 10,03238 ···<br>03262 | 10.13470       | 10.16758<br>16744                     | 10       |
| 83270                                  | 86507                         | 96763                  | 03202                 | 13493          | 16730                                 | 8        |
| 83283                                  | 86495                         | 96788                  | 03213                 | 13505          | 16717                                 | 7        |
| 85297                                  | 86483                         | 96814                  | 03186                 | 13517          | 16703                                 | 6        |
| 83310                                  | 86472                         | 96839                  | 03161                 | 13528          | 16690                                 | 5        |
| 83324                                  | 86 <b>460</b>                 | 96864                  | 03136                 | 13540          | 16676                                 | 4        |
| <b>833</b> 38                          | 86448                         | <b>9</b> 6890          | 03110                 | 13552          | 16662                                 | S        |
| 83851                                  | 86436                         | 96915                  | 08085                 | 13564          | 16649                                 | 8        |
| 88365                                  | 86425                         | <b>9</b> 6940          | 03060                 | 13575          | 16635                                 | 1        |
| 83378                                  | 86413                         | 96966                  | 03034                 | 13587          | 16622                                 | 0        |
| Co-sine.                               | Sine.                         | Co-tangent.            | Tangent.              | Co-secant.     | Secant.                               | _        |

# TABLE XI. LOGARITHMIC SINES, TANGENTS, AND SECANTS. 43 Degrees.

| 43 Degrees. |  |                |                         |                 |                        |                   |           |  |  |  |  |
|-------------|--|----------------|-------------------------|-----------------|------------------------|-------------------|-----------|--|--|--|--|
| M.          | Sine.                                  | Co-sine.       | Tangent.                | Co-tangent.     | Secant.                | Co-secant.        |           |  |  |  |  |
| 0           | 9.83378                                | 9.86413        | 9.96966                 | 10.03034        | 10.13587               | 10.16622          | 60        |  |  |  |  |
| 1           | 83392                                  | 86401          | 96991                   | 03009           | 13599                  | 16608             | 59        |  |  |  |  |
| 2           | 83405                                  | 86389          | 97016                   | 02984           | 13611                  | 16595             | 58        |  |  |  |  |
| S           | 83419                                  | 86377          | 97042                   | 02958           | 13623                  | 16581             | 57        |  |  |  |  |
| 4           | 83432                                  | · 86366        | 97067                   | 02933           | 13684                  | 16568             | 56        |  |  |  |  |
| 5           | 83446                                  | 86354          | 97092                   | 02908           | 13646                  | 16554             | 55′<br>54 |  |  |  |  |
| 6           | 89459                                  | 86342          | 97118                   | 02882           | 13658                  | 16541<br>16527    | 53        |  |  |  |  |
| 8           | 83473                                  | 86330          | .97143                  | 02857           | 13670<br>13682         | 16514             | 53        |  |  |  |  |
| 9           | <b>83486</b><br><b>8</b> 3 <i>5</i> 00 | 86318<br>86306 | 97168<br>97193          | 02832<br>02807  | 13694                  | 16500             | 51        |  |  |  |  |
|             |  |                |                         | <del></del>     |                        | <u></u>           |           |  |  |  |  |
| 10          | 9.83513                                | 9.86295        | 9.97219                 | 10 .02781       | 10.13705               | 10.16487<br>16473 | 50<br>49  |  |  |  |  |
| 11<br>12    | 83527                                  | 86283          | 97244                   | 02756           | 13717                  | 16460             | 48        |  |  |  |  |
| 13          | 83540<br>83554                         | 86271<br>86950 | 97 <b>269</b>           | 02731           | 1372 <b>9</b><br>13741 | 16446             | 47        |  |  |  |  |
| 14          | 83567                                  | 86259<br>86247 | 97 <b>29</b> 5<br>97320 | 02705<br>02680  | 13753                  | 16433             | 46        |  |  |  |  |
| 15          | 83 <i>5</i> 81                         | 86235          | 97 <del>34</del> 5      | 02655           | 19765                  | 16419             | 45        |  |  |  |  |
| 16          | 83594                                  | 86223          | 97371                   | 02629           | 13777                  | 16406             | 44        |  |  |  |  |
| 17          | 83608                                  | 86211          | 97396                   | 02604           | 13789                  | 16392             | 43        |  |  |  |  |
| 18          | 83621                                  | 86200          | 97421                   | 02579           | 13800                  | 16379             | 42        |  |  |  |  |
| 19          | 83634                                  | 86188          | 97447                   | 02558           | 13812                  | 16366             | 41        |  |  |  |  |
| 20          |  |                |                         |                 |                        | 10.16352          | 40        |  |  |  |  |
| 20          | 9,83643                                | 9.86176        | 9.97472                 | 10 . 02528      | 10.13824               | 16339             | 39        |  |  |  |  |
| 22          | 83661                                  | 86164<br>86152 | 97497                   | 02503           | 19856<br>13848         | 16326             | 38        |  |  |  |  |
| 23          | 83674<br>. 83688                       | 86140          | 97523<br>97548          | 02477<br>02452  | 13860                  | 16312             | 37        |  |  |  |  |
| 24          | 83701                                  | 86128          | 97573                   | 02427           | 13872                  | 16299             | 36        |  |  |  |  |
| 25          | 83715                                  | 86116          | 97598                   | 02402           | 13884                  | 16285             | 35        |  |  |  |  |
| 26          | 83728                                  | 86104          | 97624                   | 02376           | 13896                  | 16272             | 34        |  |  |  |  |
| 27          | 83741                                  | 86092          | 97649                   | 02351           | 13908                  | 16259             | 88        |  |  |  |  |
| 28          | 83755                                  | 86080          | 97674                   | 02326           | 13920                  | 16245             | 32        |  |  |  |  |
| 29          | 83768                                  | 86068          | 97700                   | 02300           | 13932                  | 16232             | 31        |  |  |  |  |
| 30          | 9.83781                                | 9.86056        | 9.97725                 | 10 .02275       | 10.13944               | 10.16219          | 30        |  |  |  |  |
| 31          | 83795                                  | 86044          | 97750                   | 02250           | 13956                  | 16205             | 29        |  |  |  |  |
| 32          | 83808                                  | 86082          | 97776                   | 02224           | 13968                  | 16192             | 28        |  |  |  |  |
| 33          | 83821                                  | 86020          | 97801                   | 02199           | 13980                  | 16179             | 27        |  |  |  |  |
| 84          | 83834                                  | 8,6008         | 97826                   | 02174           | 13992                  | 16166             | 26        |  |  |  |  |
| 35          | 83848                                  | 85996          | 97851                   | 02149           | 14004                  | 16152             | 25        |  |  |  |  |
| 36          | 83861                                  | 85984          | 97877                   | 02123           | 14016                  | 16139             | 24        |  |  |  |  |
| 37          | 88874                                  | 85972          | <b>9</b> 7902           | 02098           | 14028                  | 16126             | 23        |  |  |  |  |
| 38          | 83887                                  | 85950          | 97927                   | 02073           | 14040                  | 16113             | 22        |  |  |  |  |
| 39          | 83901                                  | 85948          | 97953                   | 02047           | 14052                  | 16099             | 21        |  |  |  |  |
| 40          | 9.83914                                | 9 . 85936      | 9.97978                 | 10.02022        | 10.14064               | 10.16086          | 20        |  |  |  |  |
| 41          | 83927                                  | 85924          | 98003                   | 01997           | 14076                  | 16073             | 119       |  |  |  |  |
| 42          | 89940                                  | 85912          | 98029                   | 01971           | 14088                  | 16060             | 18        |  |  |  |  |
| 43          | 83954                                  | 85900          | 98054                   | 01946           | 14100                  | 16046             | 17<br>16  |  |  |  |  |
| 44<br>45    | 83967                                  | 85888          | 98079                   | 01921           | 14112                  | 16033<br>16020    | 15        |  |  |  |  |
| 46          | 83980<br>83993                         | 85876<br>85864 | 98104<br>98130          | 01896°<br>01870 | 14124<br>14136         | 16020             | 14        |  |  |  |  |
| 47          | 84006                                  | 85851          | 98155                   | 01845           | 14149                  | 15994             | 13        |  |  |  |  |
| 48          | 84020                                  | 85839          | 98180                   | 01820           | 14161                  | 15980             | 12        |  |  |  |  |
| 49          | 84033                                  | 85827          | 98206                   | 01794           | 14173                  | 15967             | 11        |  |  |  |  |
| 50          | 9.84046                                | 9.85815        | 9.98231                 | 10,01769        | 10.14185               | 10.15954          | 10        |  |  |  |  |
| 51          | 84059                                  | 85803          | 98256                   | 01744           | 14197                  | 15941             | 9         |  |  |  |  |
| 52          | 84072                                  | 85791          | 98281                   | 01719           | 14209                  | 15928             | 8         |  |  |  |  |
| 53          | 84085                                  | 85779          | 98307                   | 01693           | 14221                  | 15915             | 7         |  |  |  |  |
| 54          | 84098                                  | 85766          | 98332                   | 01668           | 14234                  | 15902             | 6         |  |  |  |  |
| 55          | 84112                                  | 85754          | 98357                   | 01643           | 14246                  | 15888             | - 5       |  |  |  |  |
| 56          | 84125                                  | 85742          | 96383                   | 01617           | 14258                  | 15875             | 4         |  |  |  |  |
| 57          | 84138                                  | 85730          | 98408                   | 01592           | 14270                  | 15862             | 3         |  |  |  |  |
| 58          | 84151                                  | 85718          | 98433                   | 01567           | 14282                  | 15849             | 2         |  |  |  |  |
| 59          | 84164                                  | 85706          | 98458                   | 01542           | 14294                  | 15836             | 1         |  |  |  |  |
| 60          | 84177                                  | 85693          | 98484                   | 01516           | 14307                  | 15823             | 0         |  |  |  |  |
|             | Co-sine.                               | Sine.          | Co-tangent.             | Tangent.        | Co-secant.             | Secant.           | M.        |  |  |  |  |
| H.          |  |                |                         | egrees.         | <del> </del>           | <del></del>       |           |  |  |  |  |
|             |  |                |                         |                 |                        |                   |           |  |  |  |  |

TABLE XI.
LOGARITHMIC SINES, TANGENTS, AND SECANTS.

|            | 1                         |                            |                          | egrees.                | IND OLCAN               | <del></del>            | 1        |
|------------|---------------------------|----------------------------|--------------------------|------------------------|-------------------------|------------------------|----------|
| М.         | Sine.                     | Co-sine.                   | Tangent.                 | Co-tangent.            | Secant.                 | Co-secant.             |          |
| 0          | 9.84177                   | 9.85693                    | 9.98484                  | 10.01516               | 10 . 14307              | 10.15828               | 60       |
| 1          | 84190                     | 85681                      | 98509                    | 01491                  | 14319                   | 1 <i>5</i> 810         | 59       |
| 2          | 84203                     | 85669                      | 98534                    | 01466                  | 14331                   | 15797                  | 58       |
| 3          | 84216                     | 85657                      | 98560                    | 01440                  | 14343                   | 15784                  | 57       |
| 4<br>5     | 842 <b>29</b><br>84242    | 85645                      | 98585                    | 01415                  | 14355                   | 15771                  | 56       |
| 6          | 84255                     | 856 <b>32</b><br>85620     | 98610                    | 01390                  | 14368                   | 15758                  | 55<br>54 |
| 7          | 84269                     | 85608                      | 98635<br>98661           | 0136 <i>5</i><br>01339 | 14380<br>14392          | 15745<br>15731         | 53       |
| 8          | 84282                     | 85596                      | 98686                    | 01339                  | 14392                   | 15718                  | 52       |
| 9          | 84295                     | 85583                      | 98711                    | 01289                  | 14417                   | 15705                  | 51       |
| 10         | 9.84308                   | 9.85571                    | 9.98737                  | 10.01263               | 10 . 14429              | 10 . 15692             | 50       |
| 11         | 84921                     | 85559                      | 98762                    | 01238                  | 14441                   | 15679                  | 49       |
| 12         | 84384                     | 85547                      | 98787                    | 01213                  | 14458                   | 15666                  | 48       |
| 13         | 84347                     | 85534                      | 98812                    | 01188                  | 1 <del>44</del> 66      | 15653                  | 47       |
| 14         | 84360                     | 85522                      | 98838                    | 01162                  | . 1 <del>44</del> 78    | 1 <i>5</i> 640         | 46       |
| 15         | 84373                     | 85510                      | 98863                    | 01137                  | 14490                   | 15627                  | 45       |
| 16         | 84385                     | 85497                      | 98888                    | 01112                  | 14503                   | 15615                  | 44       |
| 17         | 84398                     | 85485                      | 98913                    | 01087                  | 14515                   | 15602                  | 43       |
| 18         | 84411                     | 85473                      | 98939                    | 01061                  | 14527                   | 15589                  | 42       |
| 19         | 84424                     | 85460                      | 98964-                   | 01086                  | 14540                   | 15576                  | 41       |
| 20<br>21   | 9 <b>.</b> 84437<br>84450 | 9 . <b>8</b> 5448<br>85436 | 9.98989<br>9901 <i>5</i> | 10.01011<br>00985      | 10 . 14552<br>14564     | 10.15563<br>15550      | 40<br>39 |
| 22         | 84463                     | 85423                      | 99040                    | 00960                  | 14577                   | 15537                  | 58       |
| 23         | 84476                     | 85411                      | 99065                    | 00935                  | 14589                   | 15524                  | 37       |
| 24         | 84489                     | 85399                      | 99090                    | 00910                  | 14601                   | 15511                  | 36       |
| 25         | 84502                     | 85386                      | 99116                    | 00884                  | 14614                   | 15498                  | 35       |
| 25         | 8 <b>45</b> 15            | 85374                      | 99141                    | 00859                  | 14626                   | 15485                  | 34       |
| 27         | 84528                     | 85361                      | 99166                    | 00834                  | 14639                   | 15472                  | 33       |
| 28         | 84540                     | 85349                      | 99191                    | 00809                  | 14651                   | 15460                  | 32       |
| 29         | 84553                     | 85337                      | 99217                    | 00783                  | 14663                   | 15447                  | 31       |
| .30        | 9.84566                   | 9 . 85324                  | 9.99242                  | 10.00758               | 10.14676                | 10.15434               | 30       |
| 31         | 84579                     | 85312                      | 99267                    | 00733                  | 14688                   | 15421                  | 29       |
| 32         | 84592                     | 85299                      | 99293                    | 00707                  | 14701                   | 15408                  | 28       |
| 33         | 84605                     | 85287                      | 99318                    | 00682                  | 14713                   | 15395                  | 27       |
| 34         | 84618                     | 85274                      | 99348                    | 00657                  | 14726                   | 15382                  | 26<br>25 |
| 35         | 84630<br>84643            | 85262<br>85050             | 99368                    | 00632<br>00606         | 14758<br>147 <b>5</b> 0 | 15370                  | 24       |
| 36<br>37   | 84656                     | 85250<br>85237             | 99394<br>99419           | 00581                  | 14763                   | 15357<br>153 <b>44</b> | 23       |
| 38         | 84669                     | 85225                      | 99444                    | 00556                  | 14775                   | 15331                  | 22       |
| 39         | 84682                     | 85212                      | 99469                    | 00531                  | 14788                   | 15318                  | 21       |
| 40         | 9 . 84694                 | 9 . 85200                  | 9.99495                  | 10.00505               | 10.14800                | 10.15306               | 20       |
| 41         | 84707                     | , 85187                    | 99520                    | 00480                  | 14813                   | 15293                  | 19       |
| 42         | 84720                     | 85175                      | 99545                    | 00455                  | 14825                   | 15280                  | 18       |
| 43         | 84733                     | 85162                      | <b>9</b> 9570            | 00430                  | 14838                   | 15267                  | 17       |
| 44         | 84745                     | 851 <i>5</i> 0             | 99596                    | 00404                  | 14850                   | 15255                  | 16       |
| 45         | 847 <i>5</i> 3            | 85137                      | 99621                    | 00379                  | 14863                   | 15242                  | 15       |
| 46         | 84771                     | <b>8</b> 512 <b>5</b>      | 99646                    | 00354                  | 14875                   | 15229                  | 14       |
| 47         | 84784                     | 85112                      | 99572                    | 00328                  | 14888                   | 15216                  | 13       |
| 48         | 84796                     | 85100                      | 99697                    | 00303                  | 14900<br>14913          | 15204                  | 12       |
| 49         | 84809                     | 85087                      | 99722                    | 00278                  |                         | 15191                  | 11       |
| 50<br>51   | 9 . 84822<br>84835        | 9.85074<br>85062           | 9 · 99747<br>99773       | 10 . 00253<br>00227    | 10.14926<br>14938       | 10.15178<br>15165      | 10       |
| 5 <b>2</b> | 84847                     | 85049                      | 99798                    | 00292                  | 14951                   | 151 <b>5</b> 3         | 8        |
| 53         | 84860                     | 85037                      | 99823                    | 00177                  | 14963                   | 15140                  | 7        |
| 54         | 84873                     | 85024                      | 99848                    | 00152                  | 14976                   | 15127                  | 6        |
| 55         | 84885                     | 85012                      | 99874                    | 00126                  | 14988                   | 15115                  | 5        |
| 56         | 8489 <b>8</b>             | 81999                      | 99899                    | 00101                  | 15001                   | 15102                  | 4        |
| 57         | 84911                     | 84986                      | 99924                    | 00076                  | 15014                   | 15089                  | 8        |
| 58         | 84923                     | 84974                      | 99949                    | 00051                  | 15026                   | 15077                  | 2        |
| 59         | 84936                     | 84961                      | 99975                    | 00025                  | 15039                   | 15064                  | 1        |
| 60         | 84949                     | 84949                      | 10.00000                 | 19.00000               | 15051                   | 15051                  | 0        |
|            | Co-sine.                  | Sine.                      | Co-tangent.              | Tangent.               | Co-secant.              | Secant.                | M.       |
| •          | •                         |                            | 45 De                    | Prees.                 |                         |                        | ا.       |

TABLE XII.
TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

| -   -            |                |        | N <sub>2</sub> | E.           | SIE.       |             | SĮW.           | N          | I₫W,       | or               | 1 P        | oint.      |                         |                  |
|------------------|----------------|--------|----------------|--------------|------------|-------------|----------------|------------|------------|------------------|------------|------------|-------------------------|------------------|
| D                | st. D.La       | Dep.   | Dist           | . D.Lat      | Dep.       | Dist.       | D.Lat          | Dep.       | Dist.      | D:Lat            | Dep        | Dist.      | DLa                     | t Dej            |
|                  | 1 1.0          | 0.0    | 61             | 60.9         | 3.0        | 121         | 120.9          | 5.9        | 181        | 180.8            | 8.9        | 241        | 240.                    | 7 11.8           |
|                  | 2 2.0          |        | 62             | 61.9         | 3.0        | 122         | 121.9          |            | 182        | 181.8            |            |            | 241.                    | 711.5            |
|                  | 3 8.0          |        | 63             | 62.9         |            | 123         | 122.9          |            | 183        | 182.8            |            |            |                         | 711.5            |
|                  | 4 4.0          |        | 64             | 63.9         |            | 124         | 123.9          |            | 184        | 183.8            |            |            |                         | 7 12.0           |
|                  | 5 5.0<br>6 6.0 |        | 65<br>66       | 64.9         | 3.2        | 125<br>126  | 124.8          |            | 185<br>186 | 184.8<br>185.8   |            |            |                         | 7 12.0           |
|                  | 7 7.0          |        | 67             | 66.9         |            | 127         | 126.8          |            | 187        | 186.8            |            |            |                         | 7 12.1           |
|                  | 8 8 0          |        | 68             | 67.9         |            | 128         |                |            | 188        | 187.8            |            |            |                         | 7 12.5           |
|                  | 9.0            |        | 69             | 68.9         |            | 129         | 128.8          |            | 189        | 188.8            |            |            |                         | 7 12.5           |
| 10               | 0   10.0       | 0.5    | 70             | 69.9         | 3.4        | 130         | 129.8          | 6.4        | 190        | 189.8            | 9.3        | 250        | 249.                    | 7 12.5           |
| ī                | 1 11.0         | 0.5    | 71             | 70.9         | 3.5        | 131         | 130.8          | 6.4        | 191        | 190.8            | 9.4        | 251        | 250.                    | 12.5             |
| 12               | 2   12.0       |        | 72             | 71.9         | 3.5        | 132         | 131.8          | 6.5        | 192        | 191.8            | 9.4        | 252        | 251.                    | 12.4             |
| 15               | .              |        | 73             | 72.9         | 8,6        | 133         | 132.8          |            | 193        | 192.8            |            |            |                         | 7 12.4           |
| 14               |                |        | 74             | 73 9         |            | 134         | 133.8          |            | 194        | 193.8            |            |            |                         | 7 12.5           |
| 12               |                | 0.7    | 75<br>76       | 74.9         |            | 135<br>136  | 134.8          |            | 195<br>196 | 194.8            |            |            |                         | 12.5             |
| li               |                | 0.8    | 77             | 76.9         |            | 137         | 135.8          |            | 197        | 195.8<br>196.8   | 9.6<br>9.7 |            |                         | 7 12.6<br>7 12.6 |
| 18               |                | 0.9    | 78             | 77,9         | 3.8        | 138         | 137.8          |            | 198        | 197.8            | 9.7        |            |                         | 12.7             |
| 19               |                | 0.9    | 79             | 78.9         | 3.9        | 139         | 138.8          |            | 199        | 198.8            |            |            |                         | 12.7             |
| 20               |                | 1.0    | 80             | 79.9         | 3.9        | 140         | 139.8          |            | 200        | 199.8            | 9.8        |            |                         | 12.8             |
| 21               | 21.0           | 1.0    | 81             | 80,9         | 4.0        | 141         | 140.8          | 6.9        | 201        | 200.8            | 9.9        | 261        | 260.                    | 12.8             |
| 22               |                | 1.1    | 82             | 81.9         | 4.0        | 142         | 141.8          |            | 202        | 201.8            |            | 262        |                         | 12.9             |
| 29               | 23.0           | 1.1    | 83             | 82.9         | 4.1        | 143         | 142.8          |            | 203        | 202.8            |            | 263        | 262.7                   | 12.9             |
| 24               | 1              | 1.2    | . 84           | 89.9         | 4.1        | 144         | 143.8          | 7.1        | 204        | 203.8            |            | 264        |                         | 13.0             |
| 25               |                | 1.2    | 85             | 84.9         | 4.3        | 145         | 144.8          |            | 205        | 204.8            |            |            |                         | 13.0             |
| 26               |                | 1.3    | 86<br>87       | 85.9<br>86.9 | 4.2        | 146         | 145.8<br>146.8 | 7.2<br>7.2 | 206<br>207 | 205.8<br>206.8   |            | 266<br>267 |                         | 13.1             |
| 28               |                | 1.4    | 88             | 87.9         | 4.9        | 148         | 147.8          |            | 208        | 207.7            |            | 268        |                         | 13.1             |
| 29               |                | 1.4    | 89             | 88.9         | 4.4        | 149         | 148.8          | 7.3        | 209        | 208.7            |            |            |                         | 13.2             |
| 30               |                | 1.5    | 90             | 89.9         | 4.4        | 150         | 149.8          |            | 210        | 209.7            |            | 270        | 269.7                   |                  |
| 31               | 31.0           | 1.5    | 91             | 90.9         | 4.5        | 151         | 150.8          | 7.4        | 211        | 210.7            | 10.4       | 271        | 270.7                   | 19 9             |
| 32               |                | 1.6    | 92             | 91.9         | 4.5        | 152         | 151.8          | 7.5        | 212        | 211.7            |            |            | 271.7                   |                  |
| 33               |                | 1.6    | .93            | 92.9         | 4.6        | 153         | 152.8          | 7.5        | 213        | 212.7            |            | 278        | 272.7                   |                  |
| 34               |                | 1.7    | 94             | 93.9         | 4.6        | 154         | 153.8          | 7.6        | 214        | 213.7            |            | 274        | 273.7                   |                  |
| 35               |                | 1.7    | 95             | 94.9         | 4.7        | 155         | 154.8          | 7.6        | 215        | 214.7            |            | 275        | 274.7                   |                  |
| 36               |                | 1.8    | 96<br>97       | 95.9         | 4.7        |             | 155.8          | 7.7        | 216        | 215.7            |            | 276        | 275.7                   |                  |
| 97<br>98         | 37.0           | 1.8    | 98             | 96.9<br>97.9 | 4.8        | 157<br>158  | 156.8<br>157.8 | 7.7        | 217<br>218 | 216.7<br>217.7   |            | 277<br>278 | 276.7<br>277.7          |                  |
| 39               |                | 1.9    | 99             | 98.9         | 4.9        | 159         | 158.8          | 7.8        | 219        | 218.7            |            | 279        | 278.7                   |                  |
| 40               |                | 2.0    | 100            | 99.9         | 4.9        | 160         | 159.8          | 7.9        | 220        | 219.7            |            | 280        | 279.7                   |                  |
| 41               | 41.0           | 2.0    | 101            | 100.9        | 5.0        | 161         | 160.8          | 7.9        | 221        | 220.7            | 10.8       | 281        | 280.7                   | 19.8             |
| 42               | 41.9           | 2.1    | 102            | 101.9        | 5.0        | 162         | 161.8          | 7.9        | 222        | 221.7            |            |            | 281.7                   |                  |
| 48               | 42.9           | 2.1    | 103            | 102.9        | 5.1        | 163         | 162.8          | 8.0        | 223        | 222.7            |            |            | 282.7                   |                  |
| 44               | 48.9           | 2.2    | 104            | 103.9        | 5.1        | 164         | 163.8          | 8.0        | 224        | 223.7            | 11.0       | 284        | 283.7                   | 13.9             |
| 45               | 44.9           | 2.2    | 105            | 104.9        | 5.2        |             | 164.8          | 8.1        | 225        | 224.7            |            |            | 284.7                   |                  |
| 46               | 45.9           | 2.3    | 106            | 105.9        | 5.2        |             | 165.8          | 8.1        | 226        | 225.7            |            |            | 285.7                   |                  |
| 47<br>48         | 46.9           | 2.3    | 107<br>108     | 106.9        | 5.8<br>5.8 | ,167<br>168 | 166.8<br>167.8 | 8.2        |            | 226.7 1<br>227.7 |            |            | 286.7<br>28 <b>7.</b> 7 |                  |
| 49               | 48.9           | 2.4    | 109            | 108.9        | 5.4        | 169         | 168.8          | 8.3        | 229        | 228.7            |            |            | 288.7                   |                  |
| 50               | 49.9           | 2.5    | 110            | 109.9        | 5.4        | 170         | 169.8          | 8.3        |            | 229.7            |            |            | 289.7                   |                  |
| 51               | 50.9           | 2.5    | 111            | 110.9        | 5.5        | 171         | 170.8          | 8.4        | 231        | 230.7            | 11 9       | 291        | 290.6                   | 14 9             |
| 52               | 51.9           | 2.6    |                | 111.9        | 5.5        |             | 171.8          | 8.4        |            | 231.7            |            |            | 291.6                   |                  |
| <b>5</b> 3       | 52.9           | 2.6    |                | 112.9        | 5.5        |             | 172.8          | 8.5        |            | 232.7            |            |            | 292.6                   |                  |
| 54               | 58.9           | 2.6    | 114            | 118.9        | 5.6        | 174         | 173.8          | 8.5        | 234        | 233.7            | 1.5        | 294        | 293.6                   |                  |
| 55               | 54.9           | 2.7    |                |              | 5.6        |             | 174.8          | 8.6        |            | 234.7            |            |            | 294.6                   |                  |
| 56<br>57         | 55.9           | 2.7    |                | 115.9        | 5.7        |             | 175.8          | 8.6        | 236        | 235.7            | 1.6        |            | 295.6                   |                  |
| 57<br><b>5</b> 8 | 56.9<br>57.9   | 2.8    |                |              | 5.7<br>5.8 |             | 176.8<br>177.8 | 8.7        |            | 236.71 $237.71$  |            | 297<br>298 | 296.6<br>297.6          | 14.9             |
| 59               | 58.9           | 2.9    |                |              | 5.8        |             | 178.8          | 8.8        |            | 238.7 I          |            |            | 297.6<br>298.6          |                  |
| 60               | 59.9           | 2.9    |                |              | 5.9        |             | 179.8          | 8.8        |            | 239.7            |            |            | 299.6                   |                  |
| Dist             |                |        |                |              |            |             |                | []         |            |                  |            |            |                         |                  |
| 4000             | . Dep.         | ULL2(" | TLIÈT"         | Dep. II      | Tatil      | 1) 18t.     | neb. n         | U.Lat!     | J)19T.     | neb. II          | 779[1]     | Dist.      | neb.                    | 17.14            |

TABLE XII.

## TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS. NIE. SIE. SIW. NIW, or I Point.

|  |            | nje. sje. |                  | SIE.  | Sįw. Nį |             |       | W, or Point. |          |       |              |       |      |       |          |
|--|------------|-----------|------------------|-------|---------|-------------|-------|--------------|----------|-------|--------------|-------|------|-------|----------|
| 2 2.0 0.2 62 61.7 6.1 122 121.4 12.0 182 181.117.9 242 240.8 23.9 4 4.0 0.4 64 63.7 6.3 124 125.4 12.9 184 183.1 18.0 244 342.8 23.9 5 5.5 0.0 0.6 66 65.7 6.5 125 124.4 12.9 184 183.1 18.0 244 342.8 23.9 6 6 6 6.0 0.6 66 65.7 6.5 125 124.4 12.9 184 183.1 18.0 244 342.8 23.9 8 14.8 23.8 6 6 6 6.0 0.6 66 66.7 6.6 12.5 124.4 12.4 187 186.1 18.3 247 245.8 24.2 8 8 8.0 0.8 68 67.7 6.7 129 126.4 12.4 187 186.1 18.3 247 245.8 24.2 1 10 10.0 1.0 70 69.7 6.9 130 129.4 12.7 180 189.1 18.6 250 248.8 24.5 10 10.0 1.0 70 69.7 6.9 130 129.4 12.7 180 189.1 18.6 250 248.8 24.5 11 10.9 1.1 71 70.7 17.0 131 130.4 12.8 181 19.1 19.1 18.6 250 250.8 247.1 13 12.9 1.3 73 72.6 7.9 133 182.4 13.0 185 129.1 18.6 250 248.8 24.5 11 10.9 1.1 71 70.7 17.0 131 130.4 12.8 181 19.1 19.1 18.6 250 250.8 247.1 13 12.9 1.3 73 72.6 7.9 133 182.4 13.0 185 129.1 18.6 250 250.8 247.5 14.1 13.9 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5   | Dist.      | D.Lat     | Dep.             |       |         | Dep.        | Dist. | D.Lat        | Dep.     | Dist. |              |       |      | DLat  | Dep.     |
| 2 2.0 0.2 62 61.7 6.1 122 121.4 12.0 182 181.117.9 242 240.8 23.9 4 4.0 0.4 64 63.7 6.3 124 125.4 12.9 184 183.1 18.0 244 342.8 23.9 5 5.5 0.0 0.6 66 65.7 6.5 125 124.4 12.9 184 183.1 18.0 244 342.8 23.9 6 6 6 6.0 0.6 66 65.7 6.5 125 124.4 12.9 184 183.1 18.0 244 342.8 23.9 8 14.8 23.8 6 6 6 6.0 0.6 66 66.7 6.6 12.5 124.4 12.4 187 186.1 18.3 247 245.8 24.2 8 8 8.0 0.8 68 67.7 6.7 129 126.4 12.4 187 186.1 18.3 247 245.8 24.2 1 10 10.0 1.0 70 69.7 6.9 130 129.4 12.7 180 189.1 18.6 250 248.8 24.5 10 10.0 1.0 70 69.7 6.9 130 129.4 12.7 180 189.1 18.6 250 248.8 24.5 11 10.9 1.1 71 70.7 17.0 131 130.4 12.8 181 19.1 19.1 18.6 250 250.8 247.1 13 12.9 1.3 73 72.6 7.9 133 182.4 13.0 185 129.1 18.6 250 248.8 24.5 11 10.9 1.1 71 70.7 17.0 131 130.4 12.8 181 19.1 19.1 18.6 250 250.8 247.1 13 12.9 1.3 73 72.6 7.9 133 182.4 13.0 185 129.1 18.6 250 250.8 247.5 14.1 13.9 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14.5   |            | 10        | 0.1              | 61    | 60.7    | 6.0         | 191   | 190 4        | 11 9     | 181   | 180 1        | 17 7  | 941  | 439 R | 98.6     |
| 3         3         0         0.3         63         62.7 [6.3]         129. 122.4         19.1 [18]         188 [18.1]         243         344.8 [23.5]         344.8 [23.5]         349.8 [23.6]         5         5.0 [0.6]         66         66.7 [6.4]         125 [12.4]         12.3 [18.5]         124.8 [24.5]         349.8 [23.6]         6         6.0 [0.6]         66         66.7 [6.6]         67.7 [6.7]         125 [12.4]         12.4 [18.6]         185 [18.1]         124 [24.8]         341.8 [24.2]         244.8 [34.1]         247 [24.8]         343.8 [34.0]         66.7 [6.6]         67.7 [6.7]         127 [12.6]         12.5 [18.8]         188.1 [18.7]         248 [24.4]         244.8 [24.1]         348.8 [24.2]         248.8 [24.5]         348.8 [24.2]         248.8 [24.5]         348.8 [24.2]         348.8 [24.5]         348.8 [2  |            |           |                  |       |         | - 11        |       |              |          |       |              |       |      |       |          |
| 4 4:0 0.4 64 68.7 f.6.3 124 125.4 12.9 184 183.118.0 244 342.8 25.9 5 5.5.0 0.6 66 65.7 6.5 126 125.4 12.4 186 185.118.2 246 244.8 24.1 24.8 8 8.0 0.8 68 67.7 6.7 128 127.4 12.5 188 187.118.4 248 246.8 24.8 24.1 10.0 10.0 1.0 70 69.7 6.7 128 127.4 12.5 188 187.118.4 248 246.8 24.8 24.1 10.0 10.0 1.0 70 69.7 6.9 130 129.4 12.7 190 189.1 18.6 250 248.8 24.5 11 10.9 1.1 71 70.7 7.0 131 130.4 12.8 191 190.118.7 251 249.8 24.6 11.1 10.9 1.1 71 70.7 7.0 131 130.4 12.8 191 190.118.7 251 249.8 24.6 12.1 12.1 11.9 11.9 11.2 72 71.7 7.1 132 131.4 12.9 199 191.118.8 252 250.8 25.0 12.1 12.1 11.9 1.1 11.9 11.1 11.2 12.1 11.9 11.1 11.1   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 5  |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 6 6, 0 0, 6 6 66, 05, 7 6, 5, 8 126, 125, 4 12, 4 186, 185, 118, 2 246, 244, 8 24, 18 8, 0 0, 8 68, 67, 7, 6, 7 122, 127, 4 12, 5 188, 187, 118, 4 248, 246, 8 24, 5 9, 9, 0, 0, 9 69, 68, 7 6, 8 139, 128, 4 12, 6 189, 188, 118, 5 250, 248, 8 24, 5 10, 10, 0 1, 0 1, 0 70, 69, 7 6, 9 130, 129, 4 12, 7 190, 189, 118, 6 250, 248, 8 24, 5 11 10, 9 1, 1 71, 70, 7 7, 0 131, 130, 4 12, 8 191, 190, 118, 7 251, 249, 8 24, 6 12, 112, 119, 112, 2 7, 17, 7, 1, 131, 12, 9 1, 4 7, 73, 6 7, 3 139, 182, 4 13, 0 198, 191, 118, 6 250, 248, 8 24, 5 14, 130, 198, 191, 118, 6 250, 248, 8 24, 5 14, 130, 198, 191, 118, 6 250, 248, 8 24, 6 14, 130, 198, 191, 118, 6 250, 248, 8 24, 6 14, 130, 198, 191, 118, 6 250, 248, 8 24, 6 14, 130, 198, 191, 118, 6 250, 248, 8 24, 6 14, 130, 198, 192, 118, 9 253, 251, 8 24, 8 14, 130, 198, 192, 118, 9 253, 251, 8 24, 8 14, 130, 198, 192, 118, 9 253, 251, 8 24, 8 14, 130, 198, 192, 118, 9 253, 251, 8 24, 8 14, 130, 198, 192, 118, 9 253, 251, 8 25, 1 17, 16, 9 1, 6 76, 75, 6 74, 135, 134, 133, 133, 198, 197, 191, 2 255, 253, 8 25, 1 17, 16, 9 1, 6 77, 77, 6 76, 75, 6 74, 135, 134, 134, 134, 134, 134, 134, 134, 134   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 8 8.0 0.8 68 67.7 6.7 128 127.1 125.4 12.5 188 187.1 18.4 248 246.8 24.3 9 9.0 0.9 69 68.7 6.8 129 128.4 12.5 188 187.1 18.4 248 246.8 24.3 10 10.0 10.0 70 69.7 6.9 130 129.4 12.5 189 188.1 18.5 249 247.8 24.4 12.5 11 10.9 1.1 71 70.7 7.0 131 130.4 12.8 191 190.1 18.7 251 249.8 24.5 11 11 10.9 1.1 71 70.7 7.0 131 130.4 12.8 191 190.1 18.7 251 249.8 24.5 11 11 11.9 1.2 72 711.7 7.1 132 131.4 12.9 192 191.1 18.8 252 250.8 24.7 13 12.9 11.5 13.9 1.5 72.6 7.2 133 182.4 18.0 199 191.1 18.8 252 250.8 24.7 13 12.9 11.5 13.9 1.6 74.6 7.4 135 134.3 13.1 194 193.1 19.0 254 255 251.8 251.6 15.9 1.6 76 75.6 7.4 135 134.3 13.1 194 193.1 19.0 254 255 253.8 25.8 25.8 17.9 18.7 17.7 7.6 6 7.5 6 7.4 135 134.3 13.3 196 195.1 19.9 256 254.8 25.1 17.9 1.8 78 77.6 7.6 138 138.3 13.5 196 195.1 19.9 256 254.8 25.1 19.1 19.1 19.1 19.0 19.1 18.7 251 255 253.8 253.8 253.8 19.1 19.1 19.9 19.9 19.9 19.9 19.9 19   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 8 8.0 0.8 68 67.7 6.7 128 127.4 12.5 188 187.1 18.4 248 246.8 24.5 19 9.9.0 0.9 69.7 6.8 129 128.4 12.6 189 188.1 18.5 249 247.8 24.5 11 10.9 11.0 1.0 1.0 1.0 1.0 170 69.7 6.9 130 129.4 12.7 190 189.1 18.6 250 248.8 24.5 11 10.9 11.1 71 70.7 7.0 131 139.0 12.4 12.8 191 190.1 18.7 251 249.8 24.6 12 11 12.9 11.9 1.2 72 71.7 7.1 132 137.4 12.9 199.1 118.6 250 248.8 24.5 13 12.9 191.1 18.6 250 248.8 24.5 13 12.9 191.1 18.6 250 248.8 24.5 13 12.9 191.1 18.6 250 250.8 24.7 13 12.9 11.9 1.2 72 71.7 7.1 132 137.4 13.9 191.1 18.9 191.1 18.6 252 250.8 24.6 7 13 12.9 191.1 18.6 252 250.8 24.6 7 13 12.9 191.1 18.6 252 250.8 24.6 7 13 12.9 191.1 18.6 252 250.8 24.6 7 13 12.9 191.1 18.6 252 250.8 24.6 7 13 12.9 191.1 18.6 252 250.8 24.6 7 13 12.9 191.1 18.6 252 250.8 24.6 7 13 12.9 191.1 18.6 252 250.8 24.6 7 13 12.9 191.1 18.6 252 250.8 24.6 7 13 12.9 191.1 18.6 252 250.8 24.6 7 13 12.9 191.1 18.9 1.5 191.1 191.1 255 253.8 250.0 12.1 18.9 191.1 191.1 191.1 255 253.8 250.0 12.1 18.9 191.1 191.1 255 253.8 250.0 12.1 18.9 191.1 191.1 255 253.8 250.0 12.1 18.0 191.1 191.1 255 253.8 250.0 12.1 18.0 191.1 191.1 255 253.8 250.0 12.1 191.1 191.1 255 253.8 250.0 12.1 191.1 191.1 255 253.8 250.0 12.0 191.1 191.1 255 253.8 250.0 12.0 191.1 191.1 255 253.8 250.0 12.0 191.1 191.1 255 253.8 250.0 12.0 191.1 191.1 255 253.8 250.0 12.0 191.1 191.1 255 253.8 250.0 12.0 191.1 191.1 255 253.8 250.0 12.0 191.1 191.1 191.1 255 253.8 250.0 12.0 191.1 191.1 191.1 255 253.8 250.0 12.0 191.1 191 |            |           |                  | 67    |         |             |       |              | 12.4     | 187   | 186.1        | 18.3  | 247  | 245.8 | 24.2     |
| 10.0   1.0   1.0   70   69.7   6.9   130   129.4   12.7   130   149.1   18.6   250   248.8   24.5   11   10.9   1.1   71   70.7   7.0   131   130.4   12.8   191   190.1   18.7   251   249.8   24.6   131   139.1   139.1   130.1   12.9   19.1   18.8   251   249.8   24.6   131   139.1     | 8          |           |                  | 68    |         |             | 128   | 127.4        | 12.5     | 188   | 187.1        | 18.4  | 248  | 246.8 | 24.3     |
| 11   | 9          | 9.0       | 0.9              | 69    | 68.7    | 6.8         | 129   | 128.4        | 12.6     | 189   | 188.1        | 18.5  | 249  | 247.8 | 24.4     |
| 11.9   1.9   1.9   72   71.7   7.1   132   131.4   12.9   198   191.1   18.8   252   250.8   24.7     14   13.9   1.4   74   73.6   7.3   134   133.4   13.1   194   193.1   19.0   254   252.8   24.8     15   14.9   1.5   75   74.6   7.4   73.6   7.5   74.6   7.4   73.6   7.5   75.6   7.4   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.7   75.6   75.7   75.7   75.6   75.7   75.7   75.6   75.7   75.7   75.7   75.6   75.7      | 10         | 10.0      | 1.0              | 70    | 69.7    | 6.9         | 130   | 129.4        | 12.7     | 190   | 189.1        | 18.6  | 250  | 248.8 | 24.5     |
| 11.9   1.9   1.9   72   71.7   7.1   132   131.4   12.9   198   191.1   18.8   252   250.8   24.7     14   13.9   1.4   74   73.6   7.3   134   133.4   13.1   194   193.1   19.0   254   252.8   24.8     15   14.9   1.5   75   74.6   7.4   73.6   7.5   74.6   7.4   73.6   7.5   75.6   7.4   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.6   7.5   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.6   75.7   75.7   75.6   75.7   75.7   75.6   75.7   75.7   75.6   75.7   75.7   75.7   75.6   75.7      |            | 10.0      | <del>, , '</del> | 71    | 70.7    | 70          | 101   | 100 4        | 10 0     | 101   | 100 1        | 10 7  | 051  | 040 9 | 04.6     |
| 13   12.9   1.4   74   73.6   7.2   133   182.4   13.0   195   192.1   18.9   2.53   251.8   24.9   15   14.9   1.5   75   74.6   7.4   135   134.3   13.2   195   194.1   19.1   2.55   253.8   252.8   251.8   24.9   17   16.9   1.7   77   76.6   7.5   74.6   7.4   73.6   73.3   13.4   13.1   196   194.1   19.1   2.55   253.8   252.8   251.8   24.9   17   16.9   1.7   77   76.6   7.5   73.4   73.6   73.3   13.5   13.5   196   195.1   19.2   255   253.8   252.8   251.8   24.9   17.9   18.9   1.7   77   76.6   7.5   138   138.3   13.5   198   197.0   19.4   255   255.8   25.2   253.8   25.1    |            |           |                  |       | 71.7    |             |       |              |          |       |              |       |      |       |          |
| 14   13.9   1.4   74   73.6   7.3   134   133.4   13.1   194   193.1   19.0   252   253.8   253.8   25.5   161   15.9   1.6   76   75.6   7.4   73.6   7.5   137   135   134.3   13.2   195   194.1   19.1   255   253.8   25.8   25.8   18.1   17.9   1.8   7.7   76.6   7.6   137   196.3   13.4   197   196.1   19.5   19.5   19.2   256   254.8   25.1   18.1   17.9   1.8   77.6   7.6   138   136.3   13.5   198   197.0   19.4   258   256.8   25.5   19.1  |            |           |                  |       | 79 6    |             |       |              |          | 109   | 109 1        | 18 0  |      |       |          |
| 15   14.9   1.5   75   74.6   7.4   195   194.3   195   194.1   19.1   256   254.8   25.1   17   16.9   1.7   77   76.6   7.5   137   136.3   13.3   198   197.0   19.2   256   254.8   25.1   18.1   17.9   1.8   78   77.6   7.6   7.6   138   136.3   13.4   197   196.1   19.3   257   255   825.2   25.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.2   25.3   825.3   25.3 |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 16   15, 9   1, 6   76   75, 6   7.4   796, 135, 3   13, 8   196   195, 1   19, 2   256   254, 8   25, 1   17, 19   1.8   78   77, 6   7.6   137   136, 3   13, 4   197   196, 1   19, 2   257   255   825, 2   19   18, 9   1, 9   79   78, 6   7.7   139   138   13, 6   199   197, 0   19, 4   258   255, 8   25, 2   19   18, 9   1, 9   20   80   79, 6   7.8   740   139, 3   13, 7   200   199, 0   19, 5   259   257, 8   25, 2   221   20, 9   2.1   81   80, 6   7.9   141   140, 3   13, 8   301   200, 0   19, 7   261   259, 7   25, 6   222   21, 9   2.2   82   81, 6   8.0   142   141, 5   13, 9   302   201, 0   19, 8   262   260, 7   25, 8   25, 9   2.4   84   83, 6   8.2   144   142, 3   14.0   203   202, 0   19, 9   252   262, 7   25, 9   25, 9   2.5   85   84, 6   8.2   144   142, 3   14.0   203   202, 0   19, 9   252   262, 7   25, 9   25, 9   2.5   86   85, 6   8.4   146   145, 3   14.1   204   203, 0   20, 0   204   262, 7   25, 9   2.5   204, 9   2.5   86   85, 6   8.4   146   145, 3   14.1   204   203, 0   20, 0   204   262, 7   25, 9   2.5   204, 9   2.6   87   86, 6   8.5   147   146, 3   14.4   207   206, 0   20, 2   266   264, 7   261   264, 7   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 17   |            |           |                  |       |         |             | 1     |              |          |       |              |       |      |       |          |
| 18   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 19   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 20   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 20.9   2.1   81   80.6   7.9   141   140.3   13.8   201   200.0   19.7   261   259.7   25.6   25   29.9   2.2   82   81.6   8.0   142   141.5   13.9   202   201.0   19.8   262   260.7   25.7   25.8   24.9   2.5   85   84.6   8.5   143   142.3   14.0   203   202.0   19.9   263   361.7   25.8   25   24.9   2.5   85   84.6   8.5   144   143.3   14.1   204   203.0   20.0   264   262.7   25.9   25.6   25.9   2.5   86   85.6   8.4   146   144.3   14.1   204   203.0   20.0   264   262.7   25.9   265   25.9   2.5   86   85.6   8.4   146   144.3   14.2   205   205.0   20.2   266   264.7   26.1   27   26.9   2.6   87   86.6   8.5   148   147.3   14.5   205   205.0   20.2   266   264.7   26.1   27   28.9   2.8   89   88.6   8.7   148   147.3   14.5   205   207.0   20.4   268   266.7   26.3   29.9   2.9   90   89.6   8.8   150   149.3   14.7   210   209.0   20.6   270   268.7   26.5   23   23.8   3.1   92   91.6   9.0   152   151.3   14.9   212   211.0   20.8   272   270.7   26.6   23.3   33.8   3.2   93   92.6   9.1   159   151.3   14.9   212   211.0   20.8   272   270.7   26.6   25.8     | 20         |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 22   |            |           | <del></del>      |       |         | <del></del> |       | 240.0        | 10.0     |       |              |       |      |       | 05.0     |
| 23 92 9 2.3 83 82 82 6 8.1 143 142 1203 203 020 0 19.9 263 261.7 25.8 25 24.9 2.5 85 84.6 8.5 144 143.3 14.1 204 203 020.0 264 262.7 25.9 25 24.9 2.5 85 84.6 8.5 145 144.3 14.2 205 204.0 20.1 265 263.7 126.0 265 25.9 2.5 86 85.6 8.4 146 145.3 14.3 206 205.0 20.2 266 264.7 26.1 27 36.9 2.6 87 86.6 8.5 147 146.3 14.4 207 306.0 20.3 967 265.7 26.2 28 27.9 2.7 88 87.6 8.6 148 148.3 14.6 209 208.0 20.5 96.7 26.6 26.3 29 28.9 2.8 89 88.6 8.7 148 148.3 14.6 209 208.0 20.5 269 267.7 26.4 30 29.9 2.9 90 89.6 8.8 150 149.3 14.7 210 209.0 20.6 270 268.7 26.5 31 83.1 92 91.6 9.0 152 151.3 14.9 212 210.0 20.7 271 269.7 26.6 32 31.8 3.1 92 91.6 9.0 152 151.3 14.9 212 210.0 20.7 271 269.7 26.6 33 33.8 3.1 92 91.6 9.0 152 151.3 14.9 212 211.0 20.8 272 270.7 26.7 36.4 33.8 3.3 94 93.5 9.2 154 159.3 15.1 214 213.0 21.0 20.7 274 272.7 26.9 36 35.8 3.5 94 95.5 9.2 154 159.3 15.1 214 213.0 21.0 20.7 274 272.7 26.9 36 35.8 3.5 94 95.5 9.4 156 155.2 15.3 316 15.0 21.3 212.0 20.7 274 272.7 26.9 38 37.8 3.7 98 97.5 9.6 158 157.1 156.2 15.4 217 216.0 21.3 277 275.7 27.3 38 37.8 3.7 98 97.5 9.6 158 157.1 156.2 15.4 217 216.0 21.3 277 275.7 27.3 38 37.8 3.7 98 99.5 9.7 159 158.2 15.6 219 217.9 12.1 275 273.7 27.0 40 39.8 3.9 100 99.5 9.8 160 159.2 15.7 220 218.9 21.6 280 278.7 27.4 44 43.8 4.3 404 103.5 10.2 164 165.2 15.8 21 21 219.9 21.7 21.8 282 280.6 27.6 43 42.8 4.2 109 102.5 10.1 163 162.2 16.0 223 221.9 21.9 22.9 286 286.6 27.6 44 43.8 4.3 404 103.5 10.2 164 165.2 16.0 223 221.9 21.9 22.9 22.8 280.6 27.6 44 43.8 4.3 404 103.5 10.2 164 165.2 16.0 223 221.9 21.9 22.9 22.8 280.6 27.6 44 43.8 4.3 404 103.5 10.2 164 165.2 16.0 223 221.9 22.9 22.8 280.6 27.6 24.9 49.8 4.8 4.9 100 105.5 10.4 166 165.2 16.3 226 224.9 22.9 22.8 280.6 27.6 24.9 49.8 4.8 4.9 100 105.5 10.5 167 166.2 16.4 22 25 220.9 21.8 282 280.6 27.6 23.5 25 10.1 169.5 10.7 169.2 16.0 223 220.9 22.8 280.6 27.6 28.5 25 15.7 5.1 112 111.5 11.0 172 171.1 16.9 225 225.9 22.9 286 286.6 28.2 49.8 49.8 4.9 100 100.5 10.8 170 11.7 170.9 16.8 221 229.9 22.0 22.8 220.9 22.7 229 229.6 |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 24   23.9   2.4   84   884   88.6   8.2   144   145.3   14.1   204   203.0   20.0   264   262.7   25.0   25.9   2.5   86   85.6   8.4   146   145.3   14.5   206   205.0   20.2   266   264.7   26.1   27   26.9   2.6   87   86.6   8.5   147   146.3   14.4   207   206.0   20.3   267   265.7   26.2   28   27.9   2.7   88   87.6   8.6   148   147.8   14.4   207   206.0   20.3   267   265.7   26.5   29.2   28.9   2.8   89   88.6   8.7   148   148.3   14.6   209   208.0   20.5   299   267.7   26.4   26.5   29.3   29.9   2.9   90   89.6   8.8   150   149.3   14.7   210   209.0   20.6   270   268.7   26.5   26.5   26.3   29.9   2.9   90   89.6   8.8   150   149.3   14.7   210   209.0   20.6   270   268.7   26.5   26 |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 25   |            |           |                  |       |         |             |       |              | - 1      |       |              |       |      |       |          |
| 26         25.9         2.5         86         86.6         8.5         147         146.3         14.3         207         20.6         20.2         265         265.7         26.2         27.9         2.7         88         87.6         8.6         8.6         8.7         148         147.3         14.5         208         207.0         20.4         268         266.7         265.7         266.7         265.7         266.7         266.7         266.7         266.7         266.7         266.7         266.7         266.7         266.7         266.7         266.7         266.7         266.7         266.7         266.7         267.7         266.7         267.7         266.7         267.7         267.7         267.7         267.7         267.7   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 27   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 28   27, 9  2, 7   88   87,6   8.6   148   147,3   14   5   208   207,0   20,4   268   266,7   26.3   29   28,9   2.8   89   89   88.6   8.7   148   148,3   14.6   209   208,0   20.6   206,0   206,7   26.4   30   29,9   2.9   90   89.6   8.8   150   149,3   14.7   210   209,0   20,6   270   268,7   26.5   31   30,9   3.0   91   90.6   8.9   151   150,9   14.8   211   210,0   20,7   271   269,7   26.6   32   31.8   3.1   92   91.6   9.0   152   151.3   14.9   212   211.0   20,8   272   270,7   26.7   33   32.8   3.2   93   92.6   9.1   153   152.3   15.0   213   212,0   20,9   273   271,7   26.8   34   33.8   3.4   95   94   5   9.3   155   154.3   15.1   214   213,0   21,0   274   272,7   26.8   35   34.8   3.4   95   94.5   9.3   155   154.3   15.1   214   213,0   21,0   274   272,7   27.0   36   35.8   3.5   96   95.5   9.4   156   155.2   15.3   216   215,0   21.0   274   272,7   27.0   37   56.8   3.6   97   96.5   9.5   157   156.2   15.4   217   216.0   21.3   277   274.7   27.1   38   37.8   3.7   98   97.5   9.6   158   157.2   15.5   218   217.0   21.4   278   276.7   27.3   39   38.8   3.8   99   98.5   9.7   159   158.2   15.6   219   217.9   21.5   279   277.7   27.3   40   39.8   3.9   100   99.5   9.8   160   159.2   15.7   220   218.9   21.6   280   278.7   27.4   41   40.8   4.0   101   100.5   9.9   161   160.2   15.8   221   219.9   21.7   281   279.6   27.5   42   41.8   4.1   102   101.5   10.0   162   161.2   15.9   222   220.9   221.8   282.6   27.8   44   43.8   4.3   404   103.5   10.2   164   163.2   16.1   224   222.9   22.0   284   282.6   27.8   45   44.8   4.4   105   104.5   10.5   165   164.2   16.2   252   223.9   22.1   285   288.6   27.9   46   45.8   4.5   106   105.5   10.4   166   165.2   16.3   226   224.9   22.2   287   282.6   27.8   47   40   8   4.6   107   106.5   10.5   167   166.2   16.6   229   227.9   22.4   289   287.6   28.3   49   49.8   4.8   109   108.5   10.7   169   168.2   16.6   229   227.9   22.4   289   287.6   28.3   50   49.8   4.9   110   109.5   10.8 |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 29   28, 9   2.8   89   88,6   8.7   148   148,3   14.6   209   208,0   20.5   209   268.7   26.5   31   30,9   3.0   91   90,6   8.8   150   149,3   14.7   210   209,0   20.6   270   268.7   26.5   32   31,8   3.1   92   91,6   9.0   152   151,3   14.9   211   210,0   20.8   272   270,7   26.5   33   32,8   3.2   93   92.6   9.1   153   152,3   15.0   213   212,0   20.9   273   271,7   26.8   34   33,8   3.3   94   93.5   9.2   154   159,3   15.1   214   213,0   21.0   274   272,7   26.9   35   34,8   3.4   95   94,5   9.3   155   154,3   15.2   215   214,0   21.0   274   272,7   26.9   36   35,8   3.5   96   95.5   9.4   156   155,2   15.3   216   215,0   21.2   276   274,7   271.   37   36,8   3.6   97   96.6   9.5   157   156,2   15.4   217   216,0   21.3   277   277,7   27.3   38   37,8   3.7   98   97.5   9.6   158   157,2   15.5   218   217,0   21.4   278   277,7   27.3   39   38,8   3.8   99   98.5   9.7   159   158,2   15.6   219   217,9   91.5   279   277,7   27.3   40   39,8   3.9   100   99.5   9.8   160   159,2   15.7   220   218,9   21.6   280   278.7   27.4   41   40,8   4.0   101   100.5   9.9   161   160.2   15.8   221   219,9   21.7   281   279,6   27.5   44   43,8   4.3   404   103.5   10.2   164   163.2   16.0   223   221.9   21.9   283   281.6   27.7   44   43,8   4.3   404   103.5   10.2   164   163.2   16.0   223   221.9   21.9   283   281.6   27.7   44   44,8   4.4   105   104.5   10.5   165   164.2   16.0   223   221.9   22.9   284   282.6   27.8   45   44,8   4.7   108   107.5   10.6   166   165.2   16.3   226   224.9   22.2   286   284.6   28.0   47   46   45.8   4.8   109   106.5   10.5   167   166.2   16.8   227   225.9   22.1   285   285.6   227.8   49   49.8   4.8   109   106.5   10.5   167   166.9   168.2   16.6   229   227.9   22.4   289   287.6   28.5   50   59.7   5.9   110   109.5   10.8   170   169.2   16.7   220   228.9   22.5   220   228.8   285.6   28.5   51   50.6   50.0   111   10.5   10.9   171   170.2   16.8   231   299.9   22.6   291   292.6   293.8   52   51.7   5.4 |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 30         29.9         2.9         90         89.6         8.8         150         149.3         14.7         210         209.0         20.6         270         268.7         26.5           31         30.9         3.0         91         90.6         8.9         151         150.9         14.8         211         210.0         20.7         271         269.7         26.6           32         31.8         3.1         92         91.6         9.0         152         151.3         14.9         212         211.0         20.8         272         270.7         26.7           34         35.8         3.3         94         93.5         9.2         154         153.15.0         213         212.0         20.9         273         271.7         26.8           35         34         83.4         95         94         59.4         156         155.2         15.3         216         215.0         21.1         275         273.7         271.0         274         272.7         275.7         275.3         277         275.9         28.1         157         156.2         15.5         218         217.0         21.4         278.2         277.7         27.3  |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 31   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 32   |            |           |                  |       |         | ']          |       |              |          |       |              |       |      |       | <u> </u> |
| 33 32.8 3.2 93 92.6 9.1 153 152.3 15.0 213 212.0 20.9 273 271.7 26.8 34 33.8 3.3 94 93.5 9.2 154 159.3 15.1 214 213.0 21.0 274 272.7 26.9 35 34.8 3.4 95 94 5 9.3 155 154.3 15.2 215 214.0 21.1 275 273.7 27.0 26.8 3.6 35.8 3.5 96 95.5 9.4 156 155.2 15.8 216 215.0 21.2 276 274.7 27.1 27.3 28 37.8 3.7 98 97.5 9.6 158 157.2 15.5 218 217.0 21.4 278 276.7 27.2 29 38.8 3.8 99 98.5 9.7 159 158.2 15.6 219 217.9 21.5 279 277.7 27.3 29 38.8 3.8 99 98.5 9.7 159 158.2 15.6 219 217.9 21.5 279 277.7 27.3 40 59.8 3.9 100 99.5 9.8 160 159.2 15.7 220 218.9 21.6 280 278.7 27.4 41 40.8 4.0 101 100.5 9.9 161 160.2 15.8 221 219.9 21.7 281 279.6 27.5 42 41.8 4.1 102 101.5 10.0 162 161.2 15.9 222 220.9 21.8 282 280.6 27.6 43 42.8 4.2 109 102.5 10.1 163 162.2 16.0 223 221.9 21.9 283 281.6 27.6 44 43.8 4.4 105 104.5 10.5 165 164.2 16.2 225 223.9 22.0 284 282.6 27.8 44.8 4.4 105 104.5 10.5 165 164.2 16.2 225 223.9 22.0 284 282.6 27.8 44.8 4.4 105 104.5 10.5 165 164.2 16.2 225 223.9 22.0 284 282.6 27.8 49 49.8 4.6 107 106.5 10.5 166 165.2 16.3 226 224.9 22.2 286 284.6 28.0 49.8 4.9 110 109.5 10.8 170 169.2 16.7 230 228 229.9 22.5 287 285.6 28.4 54.9 49.8 4.9 110 109.5 10.8 170 169.2 16.7 230 228 229.9 22.6 291 288.6 28.4 55 55.7 5.2 113 112.5 11.0 172 171.2 16.9 232 230.9 22.7 292 290.6 28.6 28.4 55.7 5.2 113 112.5 11.0 172 171.2 16.9 232 230.9 22.7 292 290.6 28.6 28.4 55.7 5.2 113 112.5 11.0 172 171.2 16.9 232 230.9 22.7 292 290.6 28.6 28.4 55.7 5.5 116 115.4 11.4 11.5 11.0 172 171.2 16.9 232 230.9 22.7 292 290.6 28.6 28.4 55.7 5.5 116 115.4 11.4 11.5 11.7 170.2 16.8 231 229.9 22.6 291 289.6 28.3 55.7 5.5 116 115.4 11.6 170 171.7 171.1 171.4 286 286.9 23.3 293.9 23.0 295.6 293.5 59.5 59.7 5.9 120 119.4 11.8 180 179.1 17.6 240 288.8 23.5 30 288.6 293.4 293.0 295.6 293.5 59.5 59.7 5.9 120 119.4 11.8 180 179.1 17.6 240 288.8 25.5 300 288.6 293.4 293.0 295.6 293.5 295.6 293.5 295.6 293.5 295.6 293.5 295.7 5.9 120 119.4 11.8 180 179.1 17.6 240 288.8 23.5 30 288.6 293.4 295.9 297.6 293.5 295.6 293.5 295.6 293.5 295.6 293.5 295.6 293.5 295.6 293 |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 34   |            |           |                  | -     |         |             |       |              |          |       |              |       |      |       | 1 .      |
| 35         34.8         3.4         95         94.5         9.3         155         154.3         15.2         215         214.0         21.1         275         273.7         27.0           36         35.8         3.5         96         95.5         9.4         156         155.2         15.3         216         215.0         21.3         277.7         273.7         275.7         273.2           38         37.8         3.7         98         97.5         9.6         158         157.2         15.5         218         217.0         21.4         278         276.7         27.3           40         39.8         3.8         99         98.5         9.7         159         158.2         15.6         219         217.9         21.5         279         277.7         27.3           40         39.8         3.9         100         99.5         9.8         160         159.2         15.7         220         218.9         21.7         27.3         27.7         27.3           41         40.8         4.0         101.5         10.0         162         161.5         22.1         221.9         21.7         28.6         27.5 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 36         35.8         3.5         96         95.5         9.4         156         155.2         15.3         216         215.0         21.2         276         274.7         27.1           37         \$6.8         3.6         97         96.5         9.5         157         156.2         15.4         217         216.0         21.3         277         275.7         27.2           38         37.8         3.7         98         97.5         9.6         158         157.2         15.5         218         217.0         21.4         278         276.7         27.2         29         21.9         217.9         21.5         279         277.7         27.3         40         39.8         3.9         100         99.5         9.8         160         159.2         15.7         220         218.9         21.6         280         278.7         77.4         41         40.8         4.0         101.510.0         162         161.9         15.9         222         220.9         21.8         282         280.6         27.5         42         41.8         4.1         102.510.1         163         162.2         16.0         223         221.9         191.9         282         281  |            |           |                  | -     |         |             |       |              |          |       |              |       |      |       |          |
| 37         S6.8         3.6         97         96.5         9.5         157         156.2         15.4         217         216.0         21.3         277         275.7         27.3           38         37.8         3.7         98         97.5         9.6         158         157.2         15.5         218         217.021.4         278         276.7         27.2           40         39.8         3.9         100         99.5         9.8         160         159.2         15.7         220         218.9         21.5         279         277.7         27.3           41         40.8         4.0         101         100.5         9.9         161         160.2         15.8         221         219.9         21.7         281         279.6         27.5           42         41.8         4.1         102         101.5         10.0         162         161.9         15.9         222         220.9         21.8         282         280.6         27.6           43         42.8         4.2         109         102.5         10.1         163         162.2         16.0         223         221.9         12.0         22.0         284         282.6  |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 38         37.8         3.7         98         97.5         9.6         158         157.2         15.5         218         217.0         21.4         278         276.7         27.2           40         39.8         3.9         100         99.5         9.8         160         159.2         15.7         220         218.9         21.6         280         278.7         27.3           41         40.8         4.0         101         100.5         9.9         161         160.2         15.8         221         219.9         21.7         221.8         279.6         275.7         27.4           42         41.8         4.1         102         101.5         10.0         162         161.2         15.9         222         220.9         21.8         282.2         280.6         27.6           43         42.8         4.2         109.10.5         10.1         163.162.2         16.0         223         221.9         21.8         282.2         280.6         27.6           44         43.8         4.3         404         103.5         10.2         164         163.2         16.1         224         222.9         22.0         284         282.6  |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 99 38.8 3.8 99 99.5 9.7 159 158.2 15.6 219 217.9 21.5 279 277.7 27.3 40 39.8 3.9 100 99.5 9.8 160 159.2 15.7 220 218.9 21.6 280 278.7 27.4 41 40.8 4.0 101 100.5 9.9 161 160.2 15.8 221 219.9 21.7 281 279.6 27.5 42 41.8 4.1 102 101.5 10.0 162 161.2 15.9 222 220.9 21.8 282 280.6 27.6 43 42.8 4.2 109 102.5 10.1 163 162.2 16.0 223 221.9 21.9 21.9 283 281.6 27.7 44 43.8 4.3 404 103.5 10.2 164 163.2 16.1 224 222.9 22.0 284 282.6 27.8 45 44.8 4.4 105 104.5 10.5 165 164.2 16.2 225 223.9 22.1 285 283.6 27.9 46 45.8 4.5 106 105.5 10.4 166 165.2 16.3 226 224.9 22.2 286 284.6 28.0 47.4 46.8 4.6 107.106.5 10.5 167 166.2 16.4 227 225.9 22.2 286 284.6 28.0 47.4 46.8 4.6 107.106.5 10.5 167 166.2 16.4 227 225.9 22.2 287 285.6 28.1 49.8 4.8 109 108.5 10.7 169 168.2 16.6 229 227.9 22.4 289 287.6 28.3 50 49.8 4.9 110 109.5 10.8 170 169.2 16.7 20 228.9 22.5 200 288.6 28.4 50.5 25.7 5.2 113 112.5 11.1 173 172.2 17.0 238 231.9 22.8 293.9 22.6 293.9 22.5 50 288.6 28.4 50.5 50.5 50.7 5.1 112 111.5 11.0 175 172.2 17.0 238 231.9 22.8 293.9 29.6 28.5 50.5 54.7 5.4 115 114.4 11.3 175 174.2 17.9 238 231.9 22.8 293.9 29.6 28.5 55 54.7 5.4 115 114.4 11.3 175 174.2 17.9 238 231.9 22.8 293.9 29.6 28.5 55 54.7 5.5 116 115.4 11.6 178 177.1 17.4 228 235.9 23.9 23.0 295 293.6 28.9 25.5 59.7 5.8 114 115.5 11.1 173 172.2 17.1 284 282.9 22.9 22.9 294.6 29.0 57 56.7 5.6 117 116.4 11.5 11.7 176.1 17.3 297 235 231.9 22.8 293 291.6 28.7 59.5 59.7 5.8 119 116.4 11.7 179 178.1 17.5 239 227.8 23.4 299 297.6 293.5 59.5 59.7 5.8 119 116.4 11.7 179 178.1 17.5 239 227.8 23.4 299 297.6 293.6 293.6 293.9 295.6 293.8 296.6 293.8 295.6 293.8 296.6 293.8 296.6 293.8 295.6 293.8 296.6 293.8 295.6 293.8 296.6 293.8 2 |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 40   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 41 40.8 4.0 101 100.5 9.9 161 160.2 15.8 221 219.9 21.7 281 279.6 27.5 42 41.8 4.1 102 101.5 10.0 162 161.2 15.9 222 220.9 21.8 282 280.6 27.6 43 42.8 4.2 109 102.5 10.1 163 162.2 16.0 223 221.9 21.9 283 281.6 27.7 44 43.8 4.3 404 103.5 10.2 164 163.2 16.1 224 222.9 22.0 284 282.6 27.8 45 44.8 4.4 105 104.5 10.3 165 164.2 16.2 225 223.9 22.0 284 282.6 27.8 46 45.8 4.5 106 105.5 10.4 166 165.2 16.3 226 224.9 22.2 286 284.6 28.0 47 46 8 4.6 107 106.5 10.5 167 166.2 16.3 226 224.9 22.2 286 284.6 28.0 47 46 8 4.6 107 106.5 10.5 167 166.2 16.4 227 225.9 22.2 287 285.6 28.1 48 47.3 4.7 108 107.5 10.6 168 167.2 16.5 228 226.9 22.3 288 286.6 28.3 49 49.8 4.8 109 106.5 10.7 169 168.2 16.6 229 227.9 22.4 289 287.6 28.3 50 49.8 4.9 110 109.5 10.8 170 169.2 16.7 230 228.9 22.5 200 288.6 28.4 55.0 111 110.5 10.9 171 170.2 16.8 231 229.9 22.5 200 288.6 28.4 55.0 55.0 111 110.5 10.9 171 170.2 16.8 231 229.9 22.6 291 289.6 28.5 52 51.7 5.1 112 111.5 11.0 172 171.2 16.9 232 230.9 22.7 292 290.6 28.6 53.5 52.7 5.2 113 112.5 11.1 173 172.2 17.0 235 231.9 22.8 293 291.6 28.7 54 53.7 5.8 114 113.5 11.2 174 173.2 17.1 294 282.9 22.9 294 292.6 28.8 55 54.7 5.4 115 114.4 11.3 175 174.2 17.9 236 231.9 22.8 293 291.6 28.9 56 55.7 5.5 116 115.4 11.4 11.5 11.7 179 176.1 17.5 237 235.9 23.2 297 295.6 291.5 58 57.7 5.7 18 117.4 11.6 178 177.1 17.4 238 236.9 23.3 298 296.6 29.3 59 59.7 5.9 120 119.4 11.8 180 179.1 17.5 239 227.8 23.4 299 297.6 293.5 59 59.7 5.9 120 119.4 11.8 180 179.1 17.6 240 228.8 23.5 300 238.6 294.4 292.0 238.6 294.4 292.0 238.6 294.4 292.0 238.6 294.4 292.0 238.6 294.4 292.0 238.6 294.4 292.0 238.6 294.6 290.5 294.6 29 |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 42 41.8 4.1 102 101.510.0 162 161.2 15.9 222 220.9 21.8 282 280.6 27.6 43 42.8 4.2 109 102.510.1 163 162.2 16.0 223 221.911.9 282 281.6 27.7 44 43.8 4.3 404 103.510.2 164 163.2 16.1 224 222.9 22.0 284 282.6 27.8 45 44.8 4.4 105 104.510.5 165 164.2 16.2 255 223.9 22.1 285 283.6 27.9 46 45.8 4.5 106 105.510.4 166 165.2 16.3 226 224.9 22.9 286 284.6 28.0 47 46 8 4.6 107 106.5 10.5 167 166.2 16.4 227 225.9 22.2 286 284.6 28.0 49 49.8 4.8 109 106.5 10.7 169 168.2 16.5 228 226.9 22.3 288 286.6 28.1 49 49.8 4.8 109 106.5 10.7 169 168.2 16.6 229 227.9 22.4 289 287.6 28.3 50 49.8 4.9 110 109.5 10.8 170 169.2 16.7 290 228.9 22.5 290 288.6 28.4 51.0 109.5 10.8 170 169.2 16.7 290 228.9 22.5 290 288.6 28.4 51.0 109.5 10.8 170 169.2 16.7 290 228.9 22.5 290 288.6 28.4 51.0 109.5 10.8 170 169.2 16.7 290 228.9 22.5 290 288.6 28.5 52 51.7 5.1 112 111.5 11.0 172 171.2 16.9 252 290.9 22.7 292 290.6 28.5 52 51.7 5.1 112 111.5 11.0 172 171.2 16.9 252 290.9 22.7 292 290.6 28.6 53 52.7 5.2 113 112.5 11.1 173 172.2 17.0 283 231.9 22.8 293 291.6 28.7 54 53.7 5.8 114 111.5 11.2 174 173.2 17.1 234 282.9 22.9 294.6 293.6 28.5 55 54.7 5.4 115 114.4 11.3 175 174.2 17.9 255 233.9 23.0 295 293.6 28.9 57 56.7 5.6 117 164.4 11.4 176 175 2 17.3 256 234.9 23.1 296 294.6 29.0 57 56.7 5.6 117 164.4 11.4 176 175 2 17.3 256 234.9 23.1 296 294.6 29.0 57 56.7 5.6 117 164.4 11.5 177 176.1 17.3 297 235.3 298 295.6 291. 58 57.7 5.9 120 119.4 11.8 180 179.1 17.6 240 238.8 23.5 23.9 23.0 295 297.6 29.5 59 59.7 5.9 120 119.4 11.8 180 179.1 17.6 240 238.8 23.5 300 238.6 29.4 Dist. Dep. D.Lat D |            |           |                  |       |         |             |       |              |          | ļ     |              |       |      | ļ     |          |
| 43   |            | 40.8      |                  |       |         |             |       |              |          |       | 219.9        | 21.7  | 281  |       |          |
| 44   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 45   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 46   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 47   46   8   4.6   107   106.5   10.5   167   166.2   16.4   227   225.9   22.2   287   285.6   28.1   48   47.3   4.7   108   107.5   10.6   168   167.2   16.5   228   226.9   22.3   288   286.6   28.2   49   49.8   4.8   109   108.5   10.7   169   168.2   16.6   229   227.9   22.4   289   287.6   28.3   50   49.8   4.9   110   109.5   10.8   170   169.2   16.7   220   228.9   22.5   220   228.6   28.3   51   50.8   5.0   111   110.5   10.9   171   170.2   16.8   231   229.9   22.6   291   289.6   28.5   52   51.7   5.1   112   111.5   11.0   172   171.2   16.9   232   230.9   22.7   292   290.6   28.6   53   52.7   5.2   113   112.5   11.1   173   172.2   17.0   233   231.9   22.8   293   291.6   28.7   54   53.7   5.8   114   113.5   11.2   174   173.2   17.1   294   282.9   22.9   294   292.6   28.8   55   54.7   5.4   115   114.4   11.3   175   174.2   17.2   235   233.9   23.0   295   293.6   28.5   56   55.7   5.5   116   115.4   11.4   176   175.2   17.3   236   234.9   23.1   296   294.6   290.6   58   57.7   5.7   5.8   119   116.4   11.5   177   176.1   17.3   237   235.9   23.2   297   295.6   29.1   58   57.7   5.8   119   116.4   11.7   179   178.1   17.5   239   237.8   23.4   299   297.6   293.5   59   53.7   5.8   119   118.4   11.7   179   178.1   17.5   239   237.8   23.4   299   297.6   293.5   50   59.7   5.9   120   119.4   11.8   180   179.1   17.6   240   228.8   23.5   300   298.6   29.4    Dist.   Dep.   D.Lat   Dist.    |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 48 47.3 4.7 108 107.5 10.6 168 167.2 16.5 228 226.9 22.3 288 286.6 28.2 29 49.8 4.9 100 109.5 10.8 170 169.2 16.7 230 228.9 22.5 290 288.6 28.5 25 251.7 5.1 112 111.5 11.0 172 171.2 16.9 232 230.9 22.7 292.2 290.6 28.6 28.5 25 251.7 5.1 112 111.5 11.0 172 171.2 16.9 232 230.9 22.7 292 290.6 28.6 28.5 25 251.7 5.1 112 111.5 11.0 172 171.2 16.9 232 230.9 22.7 292 290.6 28.6 28.5 254.7 5.2 113 112.5 11.1 173 172.2 17.0 255 231.9 22.8 293.9 291.6 28.7 292 290.6 28.6 25.7 5.2 113 112.5 11.1 173 172.2 17.1 234 282.9 22.9 294 292.6 28.8 25.5 54.7 5.4 115 114.4 11.3 175 174.2 17.1 234 282.9 22.9 294 292.6 28.8 25.5 54.7 5.5 116 115.4 11.4 11.3 175 174.2 17.2 235 233.9 23.0 295 293.6 28.9 29.6 28.8 25.7 5.5 116 115.4 11.4 11.5 177 176.1 17.5 237 235.9 231.9 22.8 297 295.6 291.5 295.6 291.5 295.6 291. |            |           |                  |       |         |             |       |              |          |       |              |       |      | 204.6 | 20.0     |
| 49   |            | 1         | •                |       |         |             |       | •            |          |       |              |       |      |       |          |
| 50 49.8 4.9 110 109.5 10.8 170 169.2 16.7 220 228.9 22.5 290 288.6 28.4 51 50.8 5.0 111 110.5 10.9 171 170.2 16.8 231 229.0 22.6 291 289.6 28.5 52 51.7 5.1 112 111.5 11.0 172 171.2 16.9 232 230.9 22.7 292 290.6 28.6 23.7 54 53.7 5.8 114 113.5 11.2 174 173.2 17.0 233 231.9 22.8 293 291.6 23.7 54 53.7 5.8 114 113.5 11.2 174 173.2 17.1 234 282.9 22.9 294 292.6 28.8 55 54.7 5.4 115 114.4 11.3 175 174.2 17.2 235 233.9 23.0 295 293.6 28.9 56 55.7 5.5 116 115.4 11.4 176 175 2 17.8 236 234.9 23.1 296 294.6 29.0 57 56.7 5.6 117 116.4 11.5 177 176.1 173 237 235.5 23.2 227 295.6 29.1 58 57.7 5.7 116 117.4 11.6 178 177 176.1 17.3 237 235.5 23.2 297 295.6 29.1 58 57.7 5.7 116 117.4 11.6 178 177 176.1 17.4 238 236.9 23.3 298 296.6 29.3 59 59.7 5.9 119 118.4 11.7 179 178.1 17.5 239 237.8 23.4 299 297.6 29.3 60 59.7 5.9 120 119.4 11.8 180 179.1 17.6 240 238.8 23.5 300 238.6 29.4 Dist. Dep. D.Lat Dist. Dep. D.L |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 51   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 52         51.7         5.1         112         111.511.0         172         171.2         16.9         282         280.9 22.7         292         290.6 28.6           53         52.7         5.2         113         112.5 11.1         173         172.2         17.1         233         281.9 22.8         293         291.6 28.7           54         53.7         5.4         115         114.4 11.3         175         174.2 17.1         294         292.9 29.6 28.8         293.6 28.9           55         54.7         5.4         115         114.4 11.3         175         174.2 17.2         295         293.9 23.0         295         293.6 28.9           56         55.7         5.5         116         115.4 11.4         176         175.2 17.8 26         234.9 23.1 296         294.6 29.0           57         56         5.6         117         116.4 11.5         177         176.1         17.3         237         235.5.9 23.2         297         295.6 29.1           58         57.7         5.8         119         118.4 11.7         179         178.1         17.5         239         237.8 23.3         298         295.6 29.1           59         53.7         5.8 <t< td=""><td></td><td>13.0</td><td>1.3</td><td>110</td><td>109.5</td><td>10.6</td><td>110</td><td>.'</td><td><u> </u></td><td>1</td><td><del> </del></td><td></td><td>li</td><td></td><td></td></t<>   |            | 13.0      | 1.3              | 110   | 109.5   | 10.6        | 110   | .'           | <u> </u> | 1     | <del> </del> |       | li   |       |          |
| 52         51.7         5.1         112         111.511.0         172         171.2         16.9         282         280.9 22.7         292         290.6 28.6           53         52.7         5.2         113         112.5 11.1         173         172.2         17.1         233         281.9 22.8         293         291.6 28.7           54         53.7         5.4         115         114.4 11.3         175         174.2 17.1         294         292.9 29.6 28.8         293.6 28.9           55         54.7         5.4         115         114.4 11.3         175         174.2 17.2         295         293.9 23.0         295         293.6 28.9           56         55.7         5.5         116         115.4 11.4         176         175.2 17.8 26         234.9 23.1 296         294.6 29.0           57         56         5.6         117         116.4 11.5         177         176.1         17.3         237         235.5.9 23.2         297         295.6 29.1           58         57.7         5.8         119         118.4 11.7         179         178.1         17.5         239         237.8 23.3         298         295.6 29.1           59         53.7         5.8 <t< td=""><td>51</td><td>50.8</td><td>5.0</td><td>111</td><td>110.5</td><td>10.9</td><td>171</td><td>170.2</td><td>16.8</td><td>231</td><td>229.9</td><td>22.6</td><td>291</td><td></td><td></td></t<>  | 51         | 50.8      | 5.0              | 111   | 110.5   | 10.9        | 171   | 170.2        | 16.8     | 231   | 229.9        | 22.6  | 291  |       |          |
| 54   53.7   5.8   114   113.5   11.2   174   173.2   17.1   234   282.9   22.9   294   292.6   28.8   255   54.7   5.4   115   114.4   11.3   175   174.2   17.2   235   233.9   23.0   295   293.6   28.9   294.6   29.0   294.6   | <b>5</b> 2 | 51.7      | 5.1              |       |         |             | 172   | 171.2        | 16.9     |       | 230.9        | 22.7  | 292  | 290.6 | 28.6     |
| 55 54.7 5.4 115 114.4 11.3 175 174.2 17.2 235 233.9 23.0 295 293.6 28.9 56 55.7 5.5 116 115.4 11.4 176 175 2 17.3 236 234.9 23.1 296 294.6 29.0 57 56.7 5.6 117 116.4 11.5 177 176.1 17.3 237 235.9 23.2 297 295.6 29.1 58 57.7 5.7 118 117.4 11.6 178 177.1 17.4 238 236.9 23.3 298 296.6 29.3 59 59.7 5.8 119 116.4 11.7 179 178.1 17.5 239 227.8 23.4 299 297.6 29.3 60 59.7 5.9 120 119.4 11.8 180 179.1 17.6 240 238.8 23.5 300 298.6 29.4 Dist. Dep. D.Lat D.Lat Dist. Dep. |            |           |                  |       |         |             |       |              |          |       |              |       |      | 291.6 | 28.7     |
| 56   55.7   5.5   116   115.4   11.4   176   175   2   17.8   236   234.9   23.1   296   294.6   29.0   57   56.7   5.6   117   116.4   11.5   177   176.1   17.3   237   235.9   23.2   297   295.6   29.1   58   57.7   5.7   5.7   118   117.4   11.6   178   177.1   17.4   238   236.9   23.3   298   296.6   29.3   59   53.7   5.8   119   118.4   11.7   179   178.1   17.5   239   237.8   23.4   299   297.6   29.3   60   59.7   5.9   120   119.4   11.8   180   179.1   17.6   240   258.8   25.5   300   298.6   29.4   Dist.   Dep.   D.Lat   |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 57   56.7   5.6   117   116.4   11.5   177   176.1   17.8   297   295.5   29.1   295.6   295.6    |            |           |                  |       |         |             |       |              |          |       |              |       |      | 293.6 | 28.9     |
| 58 57.7 5.7 118 117.4 11.6 178 177.1 17.4 238 236.0 23.3 298 296.6 29.2 59 53.7 5.8 119 118.4 11.7 179 178.1 17.5 239 227.8 23.4 299 237.6 29.5 60 59.7 5.9 120 119.4 11.8 180 179.1 17.6 240 228.8 23.5 300 298.6 29.4 Dist. Dep. D.Lat Dist. Dep.  |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 59 59.7 5.8 119 116.4 11.7 179 178.1 17.5 239 227.8 23.4 299 297.6 29.3 60 59.7 5.9 120 119.4 11.8 180 179.1 17.6 240 238.8 23.5 300 298.6 29.4 Dist. Dep. D.Lat Dist. Dep. Dep. D.Lat Dist. Dep. Dep. D.Lat Dist. Dep. Dep. Dep. Dep. Dep. Dep. Dep. Dep             |            |           |                  |       |         |             |       |              |          |       |              |       |      |       |          |
| 60 59.7 5.9 120 119.4 11.8 180 179.1 17.6 240 258.8 29.5 300 298.6 29.4 Dist. Dep. D.Lat   |            |           |                  |       |         |             |       |              |          |       |              |       |      | 1     |          |
| Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat  |            |           |                  |       |         |             |       |              |          |       |              |       |      | 297.0 | 00 4     |
|  |            |           | ! <i>:</i> -     | P     | 1       | 1           | H     |              | l        | M     | 1            | 1     | 1    | . 1   |          |
|  | Dist       | l Dep.    | D.Lat            | Dist. | Dep.    | D.Lat       | Dist. | Dep.         | DLa      | Dist. | Dep          | D.lat | Dist | Dep   | DJat     |
|  |            |           |                  | Ŕ     | IN.     | E           | S.    |              |          |       |              |       |      |       |          |

TABLE XII.
TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

| 1 —      | N <sub>4</sub> E. S <sub>4</sub> E. S <sub>4</sub> W. N <sub>4</sub> W, or 4 Point.                        |            |             |                |              |            |                  |              |              |                          |              |                |             |
|----------|--|------------|-------------|----------------|--------------|------------|------------------|--------------|--------------|--------------------------|--------------|----------------|-------------|
| Dist.    | Dist. D.Lat   Dep.   Dist.  D.Lat   Dep.   Dist.  D.Lat   Dep.   Dist.  D.Lat   Dep.   Dist.  D.Lat   Dep. |            |             |                |              |            |                  |              |              |                          |              |                |             |
|          |  |            | <u> </u>    | <del></del>    |              | <u> </u>   |                  |              |              |                          | ļ            |                |             |
| 1 2      | 1.0  |            | 61          | 60.3           | 9.0          | 121        | 119.7            | 17.8         | 181          | 179.0 26.6               | 241          | 238.4          |             |
| 8        | 2.0<br>8.0   |            | 62<br>63    | 61.8           | 9.1          | 122        | 120.7<br>121.7   | 17.9<br>18.0 | 182          | 180.0 26.7<br>181.0 26.9 | 242<br>243   | 239.4<br>240.4 |             |
| 4        | 4.0  |            | 64          | 63.3           | 9.4          | 123        | 122.7            | 18.2         | 184          | 182.0 27.0               |              | 241.4          |             |
| 5        | 4.9  |            | 65          | 64.3           | 9.5          | 125        | 123.6            | 18.3         |              | 183.027.1                | 245          | 242.3          |             |
| 6        | 5.9  |            | 66          | 65.3           |              | 126        | 124.6            | 18.5         | 186          | 184.0 27.3               | 246          | 248.3          |             |
| 7        | 6.9  |            | 67          | 66.3           | 9.8          | 127        | 125.6            | 18.6         | 187          | 185.0 27.4               | 247          | 244.3          |             |
| 8        | 7.9  |            | 68          | 67.3           | 10 0         | 128        | 126.6            | 18.8         | 188          | 186.0 27.6               | 248          | 245.3          | 36:4        |
| . 9      | 8.9  |            | 69          | 68.3           | 10,1         | 129        | 127.6            | 18.9         | 189          | 187.0 27.7               | 249          | 246.3          |             |
| 10       | 9.9  | 1.5        | 70          | 69.2           | 10.3         | 130        | 128.6            | 19.1         | 190          | 187.9 27.9               | 2 <b>5</b> 0 | 247.3          | 36.7        |
| 11       | 10.9   | 1.6        | 71          | 70.2           | 10.4         | 131        | 129.6            | 19.2         | 191          | 188.9 28.0               | 251          | 248.3          | 36.8        |
| 12       | 11.9   | 1.8        | 72          | 71.2           | 10.6         | 132        | 130.6            | 19.4         | 192          | 189.9 28.2               | 252          | 249.3          |             |
| 13       | 12.3   | 1.9        | 73          | 72.2           | 10.7         | 133        | 131.6            | 19.5         | 193          | 190.9 28.3               | 253          | 250.3          |             |
| 14       | 13.8   |            | 74          | 73.2           |              | 134        | 132.5            | 19.7         | 194          | 191.9 28.5               | 254          | 251.3          |             |
| 15       | 14.8   |            | 75          | 74.2           | 11.0         | 135        | 133.5            | 19.8         | 195          | 192.9 28.6               | 255          | 252.2          |             |
| 16       | 15.8   |            | 76          | 75.2           | 11.2         | 136        | 134.5            | 20.0         | 196          | 193.9 28.8               | 256          | 253.2          |             |
| 17<br>18 | 16.8   | 2.5        | 77          | 76.2           | 11.3         | 137        | 135.5            |              | 197          | 194.9 28.9<br>195.9 29.1 | 257          | 254.2          |             |
| 19       | 17.8<br>18.8   | 2.6        | 78<br>79    | 77.2           | 11.4<br>11.6 | 139        | 136.5<br>137.5   |              | 199          | 196.8 29.1               | 258<br>259   | 255.2          |             |
| 20       | 19.8   | 2.8        | 80          | 79.1           | 11.7         | 140        | 138.5            |              | 200          | 197.8 29.3               | 260          | 256.2<br>257.2 |             |
|          |  |            | -           |                |              |            |                  |              |              | ]                        |              |                |             |
| 21       | 20.8   | 3.1        | 81          | 80.1           | 11.9         | 141        | 139.5            | 20.7         | 201          | 198.8 29.5               | 261          | 258.2          |             |
| 22<br>23 | 21.8   | 3.2        | 82          | 81.1           | 12.0         | 142        | 140.5            |              | 202          | 199.8 29.6               | 262          | 259.2          |             |
| 23<br>24 | 22.8<br>23.7   | 3.4        | , 83        | 82.1           | 12.2         |            | 141.5<br>142.4   | 21.0         | 203          | 200.8 29.8               | 263          | 260.2<br>261.1 |             |
| 25       | 24.7   | 3.5<br>3.7 | 84<br>85    | 83.1<br>84.1   | 12.3<br>12.5 | 144        | 143.4            |              | 205          | 201.8 29.9<br>202.8 30.1 | 264<br>265   | 262.1          |             |
| 26       | 25.7   | 3.8        | 86          | 85.1           | 12.6         | 146        | 144.4            |              | 206          | 203.8 30.2               | 266          | 263.1          |             |
| 27       | 26.7   | 4.0        | 87          | 86.1           | 12.8         | 147        | 145.4            |              | 207          | 204.8 30.4               | 267          | 264.1          |             |
| 28       | 27.7   | 4.1        | 88          | 87.0           |              | 148        | 146.4            |              | 208          | 205.7 30.5               | 268          | 265.1          |             |
| 29       | 28.7   | 4.8        | 89          | 88.0           |              | 149        | 147.4            | 21.9         | 209          | 206.7 30.7               | 269          | 266.1          |             |
| 50       | 29.7   | 4.4        | 90          | 89.0           | 13.2         | 150        | 148.4            | 22.0         | 210          | 207.7 30.8               | 270          | 267.1          | <b>39.6</b> |
| 31       | 30.7   | 4.5        | 91          | 90.0           | 13.4         | 151        | 149.4            | 22.2         | 211          | 208.7 31.0               | 271          | 268.1          | 39.8        |
| 32       | 31.7   | 4.7        | 92          | 91.c           | 18.5         | 152        | 150.4            | 22.3         | 212          | 209 7 31.1               | 272          | 269.1          |             |
| 83       | 32.6   | 4.8        | 93          | 92.0           | 13.6         | 153        | 151.3            |              | 213          | 210.781.8                | 273          | 270.0          |             |
| 34       | 33.6   | 5.0        | 94          | 93.0           | 13.8         | 154        | 152.3            | 22.6         | 214          | 211.731.4                | 274          | 271.0          | 40.2        |
| 35       | 34.6   | 5.1        | 95          | 94.0           | 13.9         | 155        | 153.3            | 22.7         | 215          | 212.7 31.5               | 275          | 272.0          |             |
| 36       | 95.6   |            | 96          | 95.0           | 14.1         | 156        | 154.3            | 22.9         | 216          | 213.731.7                | 276          | 273.0          |             |
| 37<br>38 | 36.6   | 5.4        | 97          | 96.0           | 14.2         | 157        | 155.3            | 23.0         | 217          | 214.731.8                | 277          | 274.0          |             |
| 39       | 97.6<br>98.6   | 5.6<br>5.7 | 98          | 96.9           | 14.4<br>14.5 | 158<br>159 | 156.3<br>157.3   | 23.2<br>23.3 | 218<br>219   | 215.6 32.0<br>216.6 32.1 | 279          | 275.0<br>276.0 |             |
| 40       | 39.6   | 5.9        | 100         | 98.9           | 14.7         | 160        | 158.9            | 23.5         | 220          | 217.6 32.3               | 280          | 277.0          |             |
|          |  | !          | <del></del> |                |              |            |                  |              | <del> </del> |                          |              |                |             |
| 41       | 40.6   | 6.0        | 101         | 99.9           | 14.8         | 161        | 159.3            | 23.6         | 221          | 218.6 32.4               | 281          | 278.0          |             |
| 42       | 41.5<br>42.5   | 6.2        | 102         | 100.9          | 15.0<br>15.1 | 162<br>163 | $160 2 \\ 161.2$ | 23.8<br>23.9 | 222          | 219.6 32.6               | 282          | 278.9<br>279.9 |             |
| 44       | 43.5   | 6.5        | 103         | 102.9          | 15.1         | 164        | 162.2            | 23.9         | 223          | 220.6 32.7<br>221.6 32.9 | 284          | 280.9          |             |
| 45       | 44.5   | 6.6        | 105         | 103.9          | 15.4         | 165        | 163.2            |              | 225          | 222.633.0                | 285          | 281.9          |             |
| 46       | 45.5   | 6.7        | 106         | 104.9          | 15.6         | 166        | 164.2            | 24.4         | 226          | 223.6 33.2               | 286          | 282.9          |             |
| 47       | 46.5   | 6.9        | 107         | 105.8          | 15.7         | 167        | 165.2            | 24.5         | 227          | 224.5 33.3               | 287          | 283.9          |             |
| 48       | 47.5   | 7.0        | 108         | 106.8          | 15.8         | 168        | 166 2            | 24.7         | 228          | 225.5 33.5               | 288          | 284.9          |             |
| 49       | 48.5   | 7.2        | 109         | 107.8          | 16.0         | 169        | 167.2            | 24.8         | 229          | 226.5 33.6               | 289          | 285.9          |             |
| 50       | 49.5   | 7.9        | 110         | 108.8          | 16.1         | 170        | 168.2            | 24.9         | 230          | 227.5 33.7               | 290          | 286.9          | 42.6        |
| 51       | 50.4   | 7.5        | 111         | 109.8          | 16.3         | 171        | 169.1            | 25.1         | 231          | 228.5 33.9               | 291          | 287.9          | 42.7        |
| 52       |  | 7.6        | 1           |                | 16.4         |            | 170.1            |              |              | 229.5 34.0               | 1 -          | 288.8          |             |
| 53       | 52.4   | 7.8        | 113         | 111.8          | 16.6         | 173        | 171.1            | 25.4         |              | 230 <b>.5</b> 34.2       | 293          | 289,8          | 48.0        |
| 54       | 53.4   |            |             | 112.8          | 16.7         | 174        | 172.1            | 25.5         | 234          | 231.534.3                |              | 290.8          | 43.1        |
| 55       | 54.4   |            |             | 113.8          |              | 175        | 173.1            | 25.7         | 235          | 282.5 \$4.5              |              | 291.8          |             |
| 56       | 55.4   |            |             | 114.7          |              | 176        | 174.1            | 25.8         | 236          | 233.4 34.6               | 296          | 292.8          |             |
| 57<br>58 |  | 8.4        |             | 115.7<br>116.7 | 17.2<br>17.3 | 177<br>178 | 175.1<br>176.1   | 26.0<br>26.1 | 237<br>238   | 284.4 84.8<br>285.4 84.9 | 297<br>298   | 293.8<br>294.8 |             |
| 59       | 58.4   |            |             | 117.7          |              | 179        | 177.1            | 26.3         | 239          | 236.4 35.1               | 3            | 295.8          |             |
| 60       | 59.4   |            |             | 118.7          |              | 180        | 178.1            | 26.4         | 240          | 237.4 35.2               |              | 296.8          |             |
|          |  | ······     | <u></u>     |                |              |            |                  |              |              | ]                        |              | ļ              |             |
| Dist.    | Dep.   | D.Lat      |             |                | D,Lat        |            |                  |              |              | Dep. D.lat               |              |                | ידתו        |
|          | ,  | EN         |             | E3:            | S.           | W:         | ls.              | . W          | 74N,         | or 7:                    | Point        | s.             |             |
|          | Lin. Die Win Will, Originals   |            |             |                |              |            |                  |              |              |                          |              |                |             |

|   |   | 6E.      | S&E.                     |       | W.             |              | Now,                     |                          | 1 Poin         |                |              |
|---|---|----------|--------------------------|-------|----------------|--------------|--------------------------|--------------------------|----------------|----------------|--------------|
| Dist.                                   |   |          | DLat Dep.                |       |                |              |                          |                          |                | DLat           | Dep.         |
| 1                                       | 1.0 0.2   | 61       | 59.8 11.9                | 1,    | 118.7          | 23.6         | 181                      | 177.5 35.8               | 241            |                | 17.0         |
| 2                                       | 2.0 0.4   | 62       | 60.8 12.1                | 122   | 119.7          | 23.8         | 182                      | 178.5 35.5               | 242            | 237.4          | 47.2         |
| 3                                       | 2.9 0.6   | 63       | 61.8 12.3                | 123   | 120.6          | 24.0         | 185                      | 179.5 35.7               | 243            | 238.3          | 47.4         |
| 4<br>5                                  | 3.9 0.8<br>4.9 1.0  | 64<br>65 | 62.8 12.5<br>63.8 12.7   |       | 121.6          |              |                          | 180.5 35.9               | 244<br>245     | 239.8<br>240.3 |              |
| 6                                       | 5.9 1.2   | 66       | 63.8 12.7                |       | 122.6<br>123.6 |              | 185<br>186               | 181.4 36.1<br>182.4 36.3 |                | 240.3          |              |
| 7                                       | 6.9 1.4   | 67       | 65.7 13.1                | 127   | 124.6          | 24.8         |                          | 183.4 36.5               | 247            | 242.5          | 48.2         |
| 8                                       | 7.8 1 6   | 68       | 66.7 13.3                |       | 125.5          |              | 188                      | 184.4 86.7               | 248            | 248.2          |              |
| 9<br>10                                 | 8.8 1.8<br>9.8 2.0  | 69<br>70 | 67.7 13.5<br>68.7 13.7   |       | 126.5<br>127.5 |              | 189<br>190               | 185.4 36.9<br>186.3 37.1 | 249<br>250     | 244.2<br>245.2 |              |
|   |   | ·        | ·                        | !     |                |              |                          |                          |                |                |              |
| 11<br>12                                | 10.8 2.1  | 71<br>72 | 69.6 13.9<br>70.6 14.0   |       | 128.5<br>129.5 |              | 191                      | 187.3 37.3<br>188.3 37.5 | 251<br>252     | 246,2<br>247.2 |              |
| 12                                      | 12.8 2.5  | 72       | 70.6 14.0                |       | 129.5          |              | 192                      | 188.3 37.5               |                | 247.2<br>248.1 |              |
| 14                                      | 13.7 2.7  | 74       | 72.6 14.4                | 134   | 131.4          | 26.1         |                          | 190.3 37.8               | 254            | 249.1          | 49.6         |
| 15                                      | 14.7 2.9  | 75       | 78.6 14.6                | 135   | 132.4          | 26.3         | 195                      | 191.3 38.0               | 255            | 250.1          | 49.7         |
| 16<br>17                                | 15.7 3.1<br>16.7 3.3  | 76       | 74.5 14.8                |       | 133.4          |              |                          | 192.238.2<br>193.238.4   |                | 251.1<br>252.1 |              |
| 18                                      | 16.7 3.3<br>17.7 3.5  | 77       | 75.5 15.0<br>76.5 15.2   |       | 134.4<br>135.3 |              |                          | 193.238.4                |                | 258.1          |              |
| 19                                      | 18.6 3.7  | 79       | 77.5 15.4                | 139   | 136.3          | 27.1         | 199                      | 195.238.8                | 259            | 254.0          | 50.5         |
| 20                                      | 19 6 3.9  | 80       | .78.5 15.6               |       | 137.3          | 27.3         |                          | 196.239.0                |                | 255.0          |              |
| 21                                      | 20.6 4.1  | 81       | 79.4 15.8                |       | 138.3          | 27.5         | 201                      | 197.1 39.2               |                | 256.0          |              |
| 22                                      | 21.6 4.3  | 82       | 80.4 16.0                | 142   | 189.8          | 27.7         | 202                      | 198.139.4                | 262            | 257.0          | 51.1         |
| 23                                      | 22.6 4.5  | 83       | 81.4 16.2                |       | 140.3          |              |                          | 199.1 39.6               |                | 257.9          |              |
| 24<br>25                                | 23.5 4.7<br>24.5 4.9  | 84<br>85 | 82.4 16.4<br>83.4 16.6   |       | 141.2          | 28.1<br>28.3 |                          | 200.139.8<br>201.149.0   | 264<br>265     | 258.9<br>259.9 |              |
| 26                                      | 25.5 5.1  | 86       | 84.3 16.8                |       | 143.2          | 28.5         |                          | 202.040.2                |                | 260.9          |              |
| 27                                      | 26.5 5.3  | 87       | 85.3 17.0                | 147   | 144.2          | 28.7         | 207                      | 203.0 40.4               | 267            | 261.9          | 52. I        |
| 28                                      | 27.5 5.5  | 88       | 86.3 17.2                |       | 145.2          | 28.9         |                          | 204.040.6                |                | 262.9          |              |
| 29<br>30                                | 28.4 5.7<br>29.4 5.9  | 89<br>90 | 87.3 17.4<br>88.3 17.6   |       | 146.1<br>147.1 | 29.1<br>29.3 |                          | 205.040.8<br>206.041.0   |                | 263.8<br>264.8 |              |
|   |   |          |                          | !     |                |              | <u> </u>                 | ·                        |                |                |              |
| 31<br><b>32</b>                         | 30.4 6 0<br>31.4 6.2  | 91<br>92 | 89.3 17.8<br>90.2 17.9   |       | 148.1<br>149.1 | 29.5<br>29.7 |                          | 206.941.2<br>207.941.4   |                | 265.8<br>266.8 |              |
| 33                                      | 32.4 6.4  | 92       | 90.2 17.9                | 158   | 150.1          | 29.8         |                          | 208.941.6                |                | 267.8          |              |
| 94                                      | 33.3 6.6  | 94       | 92.2 18.3                | 154   | 151.0          | 30.0         | 214                      | 209.941.7                | 274            | 268.7          | 53. <b>5</b> |
| <b>3</b> 5                              | 34.3 6.8  | 95       | 98 2 18.5                |       | 152.0          | 30.2         |                          | 210.941.9                | 275            | 269.7          |              |
| 36<br>37                                | 35.3 7.0 <b>36.3</b> 7.2  | 96<br>97 | 94.2 18.7                |       | 153.0<br>154.0 | 30.4         |                          | 211.8 42.1<br>212.8 42.3 |                | 270.7 $271.7$  |              |
| 38                                      | 37.3 7.4  | 98       | 96.1 19.1                |       | 155.0          | 30.8         |                          | 213.8,42.5               | 278            | 272.7          |              |
| 39                                      | 38.3 7.6  | 99       | 97.1 19.3                | 159   | 155.9          | 31.0         | 219                      | 214.8 42.7               | 279            | 273.6          | 54.4         |
| 40                                      | 39.2 7.8  | 100      | 98.1 19.5                | 160   | 156.9          | 81.2         | `220                     | 215.8 42.9               | 280            | 274.6          | 54 6         |
| 41                                      | 40.2 8.0  | 101      | 99.1 19.7                |       | 157.9          |              |                          | 216.8 43.1               |                | 275.6          |              |
| 42                                      | 41.2 8.2  | 102      | 100.0 19.9               | 162   | 158.9          | 31.6         | 222                      | 217.7 43.3               | 282            | 276.6          | 55.0         |
| 43<br>44                                | 42.2 8.4<br>43.2 8.6  | 103      | 101.0 20.1<br>102.0 20.8 |       | 159.9<br>160.8 | 31.8         |                          | 218.7 43.5<br>219.7 43.7 |                | 277.6<br>278.5 |              |
| 45                                      | 43.2 8.8  |          | 102.0 20.5               |       | 161.8          | 32.2         | 225                      | 220.7 43.9               |                | 278.5<br>279.5 |              |
| 46                                      | 45.1 9.0  | 106      | 104.0 20.7               | 166   | 162.8          | 32.4         | 226                      | 221.7 44.1               | 286            | 280.5          | 55.8         |
| 47                                      | 46.1 9.2  | 107      | 104.9 20.9               |       | 163.8          | 32.6         |                          | 222.6 44.3               | 287            | 281.5          |              |
| 48                                      | 47.1 9.4<br>48.1 9.6  |          | 105.9 21.1<br>106.9 21.3 |       | 164.8<br>165.8 | 32.8<br>33.0 |                          | 223.6 44.5<br>224.6 44.7 | 288<br>289     | 282.5<br>283.4 |              |
| 50                                      | 49.0 9.8  |          |                          |       | 166.7          | 33.2         |                          | 225.6 44.9               |                | 284.4          |              |
| 51                                      | 50.0 9.9  |          | 108.9 21.7               |       | 167.7          | 39.4         |                          | 226.6 45.1               | 291            | 285.4          | <u></u>      |
| 52                                      | 51.0 10.1   |          | 108.9 21.7               | 172   | 167.7          |              |                          | 226.6 45.1<br>227.5 45.3 |                | 285.4<br>286.4 |              |
| 53                                      | 52.0 10.3   | 113      | 110.8 22.0               | 173   | 169.7          | 33.8         | 233                      | 228.5 45.5               | 293            | 287.4          | 57.2         |
| 54                                      | 54   58.0 10.5    114  111.8   22.5                                       |          | 174                      | 170.7 | 33.9           | 234          | 229.5 45.7               | 294                      | 288.4          | 57. <b>4</b>   |              |
| 55<br>56                                | 55   53.9 10.7   115   112.8   22.4                                       |          | 175                      | 171.6 | 94.3           | 235<br>236   | 230.5 45.8<br>231.5 46.0 |                          | 289.3<br>290.3 |                |              |
| 57                                      | 56   54.9 10.9   116   113.8   22.6   57   55.9 11.1   117   114.8   22.8 |          |                          | 177   | 172.6<br>173.6 | 5            | 236                      | 231.546.0                |                | 290.3          |              |
| 58                                      | <b>58</b>   <b>56.9</b>   11.3   118   115.7   23.0                       |          |                          | 178   | 174.6          | 34.7         | 238                      | 233.4 46.4               | 298            | 292.3          | 58.1         |
| 59 57 9 11.5 119 116.7 23.2             |   |          |                          | 179   | 175.6          | 34.9         | 239                      | 234.4 46.6               | 299            | 293.3          | 58.3         |
| 60 58.811.7 120 117.7 23.4 1            |   |          |                          |       | 176.5          | ¥            |                          | 235.4 46.8               |                | 294.2          |              |
| Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. |   |          |                          |       | Dep.           | D.L.at       | Dist.                    | Dep. D.lat               | Dist.          | Dep.           | D.Lat        |
|   | E.6.  | N.       | E6S.                     | W     | 76S.           | · v          | V6N,                     | or 7                     | Point          | s.             |              |

TABLE XII.
TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS. 88

| <b>I</b> — | 110          | Non          |            |                | IE.          |            | WW.            |              | N6W4V | V I                |      | 1½ Po      |                |       |
|------------|--------------|--------------|------------|----------------|--------------|------------|----------------|--------------|-------|--------------------|------|------------|----------------|-------|
| Diet       | DIat         |              |            |                | T            |            |                |              |       | D.La:              |      |            | D.Lat          | Den   |
|            |              |              |            | <u> </u>       |              | <u> </u>   |                |              |       |                    |      |            | <u> </u>       |       |
| 1          | 1.0          | 0.2          | 61         | 59.2           | 14.8         |            | 117.4          | 29.4         |       | 175.6              |      | 241        | 233.8          |       |
| 9          | 1.9<br>2.9   |              | 62<br>63   | 60.1<br>61.1   | 15.1<br>15.3 |            | 118.3<br>119.3 |              |       | 176.5<br>177.5     |      |            | 234.7<br>235.7 |       |
| 4          | 3.9          |              | 64         | 62.1           | 15.6         |            | 120.3          |              |       | 178.5              |      |            | 236.7          |       |
| 5          | 4.9          |              | 65         | 63.1           | 15.8         | 125        | 121.3          | 30.4         |       | 179.5              |      | 245        | 237.7          |       |
| 6          | 5.8          |              | . 66       | 64.0           | 16.0         | 126        | 122.2          | 30.6         |       | 180.4              |      | 246        | 238.6          |       |
| 7          | 6.8          | 1.7          | 67         | 65.0           | 16.3         | 127        | 123.2          | 30.9         |       | 181.4              |      |            | 239.6          |       |
| 8          | 7.8          |              | 68         | 66.0           | 16.5         |            | 124.2          | 31.1         |       | 182.4              |      |            | 240.6          |       |
| 9          | 8.7          |              | 69         | 66.9           | 16.8         |            | 125.1          | 31.3         |       | 183.8              |      |            | 241.5          |       |
| 10         | 9.7          | 2.4          | 70.        | 67.9           | 17.0         | 130        | 126.1          | 31.6         | 190   | 184.9              |      | 230        | 242.5          | ov. 7 |
| 11         | 10.7         | 2.7          | 71         | 68.9           | 17.3         |            | 127.1          | 31.8         | 191   | 185.3              |      |            | 243.5          |       |
| 12         | 11.6         |              | 72         | 69.8           | 17.5         |            | 128.0          | 32.1         | 192   | 186.24             | 6.7  |            | 244.4          |       |
| ·13<br>14  | 12.6<br>13.6 |              | 73         | 70.8           | 17.7         |            | 129.0          | 32.3         |       | 187.24<br>188.24   |      |            | 245.4          |       |
| 15         | 14.6         |              | 74<br>75   | 71.8<br>72.8   | 18.0<br>18.2 | 134<br>135 | 130.0<br>131.0 | 32.6<br>32.8 |       | 189.24             |      |            | 246.4<br>247.4 |       |
| 16         | 15.5         |              | 76         | 73.7           | 18.5         | 136        | 131.9          | 83.0         | 196   | 190.1              | 7.6  |            | 248.3          |       |
| 17         | 16.5         |              | 77         | 74.7           | 18.7         |            | 132.9          | 33.3         | 197   | 191.1              | 17.9 |            | 249.3          |       |
| 18         | 17.5         |              | 78         | 75.7           | 19.0         |            | 133.9          | 33. 5        | 198   | 192.14             | 18.1 | 258        | 250.3          | 62.7  |
| 19         | 18.4         |              | 79         | 76.6           | 19.2         | 139        | 134.8          | 33.8         |       | 193.0              |      |            | 251.2          |       |
| 20         | 19.4         | 4.9          | 80         | 77.6           | 19.4         | 140        | 135.8          | 34.0         | 200   | 194.0              | 8.6  | 260        | 252.2          | 63.2  |
| 21         | 20.4         | 5.1          | 81         | 78.6           | 19.7         | 141        | 136.8          | 34.3         |       | 195.0              |      |            | 253.2          |       |
| 22         | 21.3         | 5.8          | 82         | 79.5           | 19.9         | 142        | 187.7          | 34.5         | 202   | 195.94             |      | 262        | 254.1          | 63.7  |
| 23         | 22.3         |              | 83         | 80.5           | 20.2         |            | 138.7          | 34.7         |       | 196.94             |      |            | 255.1          |       |
| 24         | 23.3         |              | 84         | 81.5           | 20.4         |            | 139.7          | 35.0         | 1     | 197.94             | 11   |            | 256.1          |       |
| 25<br>26   | 24.3<br>25.2 | 6.1<br>6.3   | 85<br>86   | 82.5           | 20.7         |            | 140.7          | 35.2<br>35.5 |       | 198.94<br>199.85   |      |            | 257,1<br>258.0 |       |
| 27         | 26.2         |              | 87         | 83.4<br>84.4   | 20.9         |            | 141.6<br>142.6 | 35.7         |       | 200.85             |      |            | 259.0          |       |
| 28         | 27.2         |              | 88         | 85.4           | 21.4         |            | 143.6          | 36.0         |       | 201.8              |      |            | 260.0          |       |
| 29         | 28.1         | 7.0          | 89         | 86.3           | 21.6         |            | 144.5          | 36.2         |       | 202.7 5            |      |            | 260.9          |       |
| 30         | 29.1         | 7.3          | 90         | 87.3           | 21.9         | 150        | 145.5          | 36.4         | 210   | 203.7              | 51.0 | 270        | 261 9          | 65.6  |
| 31         | 30.1         | 7.5          | 91         | 88.3           | 22.1         | 151        | 146.5          | 36.7         | 211   | 204.7 5            | 1.8  | 271        | 262.9          | 65.B  |
| 32         | 31.0         | 7.8          | 92         | 89.2           | 22.4         |            | 147.4          | 36.9         |       | 205.65             |      |            | 263.8          |       |
| 33         | 32.0         | 8.0          | 93         | 90.2           | 22.6         |            | 148.4          | 37.2         |       | 206.65             |      |            | 264,8          |       |
| 34         | 33.0         | - 1          | 94         | 91.2           | 22.8         |            | 149.4          | 37.4         |       | 207.65             |      |            | 265.8          |       |
| 35<br>36   | 34.0<br>34.9 | 8.5          | 95<br>96   | 92.2           | 23.1         | 155        | 150.4          | 37.7<br>37.9 |       | 208 6 5<br>209 5 5 |      |            | 266.8<br>267.7 |       |
| 37         | 35.9         | 9.0          | 97         | 93.1<br>94.1   | 23.3<br>23.6 |            | 151.3<br>152.3 | 38.1         |       | 210.5              |      |            | 268.7          |       |
| 38         | 36.9         | 9.2          | 98         | 95.1           | 23.8         |            | 153.8          | 38.4         |       | 211.5              |      |            | 269.7          |       |
| 39         | 37.8         | 9.5          | 99         | 96.0           | 24.1         |            | 154.2          | 38.6         |       | 212.4              | 33.2 |            | 270.6          | 67.8  |
| 40         | 38.8         | 9.7          | 100        | 97.0           | 24.3         | 160        | 155.2          | 38.9         | 220   | 213.4              | 53.5 | 280        | 271.6          | 68.0  |
| 41         | 39.8         | 10.0         | 101        | 98.0           | 24.5         | 161        | 156.2          | 39.1         | 221   | 214.45             | 53.7 | 281        | 272.6          | 68.3  |
| 42         | 40.7         |              | 102        | 98.9           | 24.8         |            | 157.1          | 39.4         |       | 215.3              | 53.9 | 282        | 273.5          | 68.5  |
| 43         | 41.7         |              | 103        | 99.9           | 25.0         | 163        | 158.1          | 39.6         |       | 216.3              |      |            | 274.5          |       |
| 44         | 42.7         |              | 104        | 100.9          | 25.3         |            | 159.1          | 39.8         |       | 217.3              |      |            | 275.5          |       |
| 45<br>46   | 43.7<br>44.6 |              | 105        | 101.9          | 25.5         | 165        | 160.1          | 40.1         |       | 218.8 5<br>219.9 5 |      |            | 276.5<br>277.4 |       |
| 47         | 45.6         |              | 106<br>107 | 102.8<br>103.8 | 25.8<br>26.0 | 166<br>167 | 161.0<br>162.0 | 40.3<br>40.6 |       | 220.2              |      |            | 278.4          |       |
| 48         | 46.6         |              | 108        | 104.8          | 26.2         | 168        | 163.0          | 40.8         |       | 221.2              |      |            | 279.4          |       |
| 49         | 47.5         | 11.9         | 109        | 105.7          | 26.5         | 169        | 163.9          | 41.1         | 229   | 222.1              | 55.6 | 289        | 280.3          | 70.2  |
| 50         | 48.5         | 12.1         | 110        | 106.7          | 26.7         | 170        | 164.9          | 41.3         | 230   | 223.1              | 55.9 | 290        | 281.3          | 70.5  |
| 51         | 49.5         | 12.4         | 111        | 107.7          | 27.0         |            | 165.9          |              | 231   | 224.1              | 56.1 |            | 282.3          |       |
| 52         | 50.4         | 12.6         | 112        | 108.6          | 27.2         | 172        | 166.8          |              | 232   | 225.0              | 56.4 | 292        | 283.2          | 71.0  |
| 53         |              | 12.9         | 113        | 109.6          | 27.5         | 173        | 167.8          | 42 0         | 233   | 226.0              | 56.6 | 293        | 284.2          | 71.2  |
| 54         | 52.4         |              |            | 110.6          | 27.7         | 1          | 168.8          | 42.3         |       | 227.0              |      |            | 285.2          |       |
| 55<br>56   | 53.4         |              |            | 111.6          | 27.9         | 175        | 169.8          | 42.5         |       | 228.0              |      |            | 286.2          |       |
| 56<br>57   | 54.3         | 13.6<br>13.8 |            | 112.5          | 28.2<br>28.4 |            | 170.7<br>171.7 | 42.8<br>43.0 |       | 228.9<br>229.9     |      | 296<br>297 | 288.1          | 71.9  |
| 58         | 56.8         |              |            | 113.5<br>114.5 | 28.7         | 177<br>178 | 179.7          |              |       | 230.9              |      | 298        | 289.1          | 72.4  |
| 59         | 57.2         | 14.3         |            | 115.4          |              |            | 173.6          |              |       | 231.8              |      | 299        | 290.0          | 72.7  |
| 60         |              | 14.6         |            | 116.4          |              | 180        | 174.6          | 43.7         |       | 232.8              |      | 300        | 291.0          | 72.9  |
| Dist.      |              |              | Dist       | Den            | D.Lat        | Dist       | Den            | D.Lat        | Dist  | Dep.               | Dlas | Dist       | Dep.           | DLat  |
|            | P.           |              | ·          |                |              |            |                |              |       |                    |      |            |                | ·     |
| H          |              | E6N          | 4N.        | E              | S¥S.         | W          | 6s <b>is</b> . | W            | Ninin | •                  | or 6 | l Poin     | ts.            |       |

E6N4N.

E∂SĮS.

W∂SĮS.

W6N₹N,

or 6½ Points.

| 84.             |              | Abelian w.   |            | 57 FF          |              |            | LE I                   |              | Man .      | , On man               | p 00==   | D A CC                                 |               |
|-----------------|--------------|--------------|------------|----------------|--------------|------------|------------------------|--------------|------------|------------------------|----------|--|---------------|
|                 | TRA          |              |            |                |              |            |                        |              |            | OF TH                  |          |  |               |
| Dist            | D.Lat        | NbE.         |            | S/E<br>D.Lat   | <u> </u>     |            | V <b>½W.</b><br>D.Lat∣ |              | Dist.      | V, o                   |          | D.Lat                                  | Den.          |
| 1               | 1.0          | υ. <b>3</b>  | 61         | 58.4           | 17.7         | 121        | 115.8                  | 35.1         |            | 173.2 52.              |          | 230.6                                  |               |
| 2               | 1.9          | 0.6          | 62         | 59.3           | 18.0         | 121        | 116.7                  | 35.1         |            | 173.2 52.<br>174.2 52. |          | 231.6                                  | 70.2          |
| 3               | 2.9          | 0.9          | 63         | 60.3           | 18.3         | 123        | 117.7                  | 35.7         | 183        | 175.1 53.              | 1 243    | 232.5                                  | 70.5          |
| 5               | 3:28<br>4.8  | 1.2          | 64<br>65   | 61.2           | 18.6<br>18.9 | 124<br>125 | 118.7                  | 36.0<br>36.3 | 184<br>185 | 176.1 53.<br>177.0 53. |          | 233.5<br>234.5                         | 70.8<br>71.1  |
| 6               | 5.7          | 1.7          | <b>6</b> 6 | 63.2           | 19.2         | 126        | 120.6                  | 36.6         | 186        | 178.0 54.              | 0 246    | 235.4                                  | 71.4          |
| .7              | 6.7          | 2.0          | 67         | 64.1           | 19.4         | 127        | 121.5                  | 36.9         | 187        | 178.9 54.              | 3 247    | 296.4                                  |               |
| 8               | 7.7<br>8.6   | 2.6          | 68<br>69   | 65.1<br>66.0   | 19.7<br>20.0 | 128<br>129 | 122.5<br>123.4         | 37.2<br>37.4 | 188<br>189 | 179.9 54.<br>180.9 54. |          | 237.3<br>238.3                         |               |
| 10              | 9.6          | 2.9          | 70         | 67.0           | 20.3         | 130        | 124.4                  | 37.7         | 190        | 181.8 55.              |          | 239.2                                  |               |
| 11              | 10.5         | 3.2          | 71         | 67.9           | 20.6         | 131        | 125.4                  |              | 191        | 182.8 55.              |          | 240.2                                  |               |
| 12              | 11.5         | 3.5          | 72<br>79   | 68.9           | 20.9         | 132        | 126.3                  | 38.3         | 192        | 183.7 55.              | 7 252    | 241.1<br>249.1                         |               |
| 13<br>14        | 12.4<br>13.4 |              | 73<br>74   | 69.9<br>70.8   | 21.2<br>21.5 | 133<br>134 | 127.3<br>128.2         | 38.6<br>38.9 | 193<br>194 | 184.7 56<br>185.6 56   |          | 242.1<br>243.1                         | 1             |
| 15              | 14.4         | 4.4          | 75         | 71.8           | 21.8         | 135        | 129.2                  | 39.2         | 195        | 186.6 56               | 6 255    | 244.0                                  | 74.0          |
| 16              | 15.3         | 4.6          | 76<br>77   | 72.7           | 22.1         | 136        | 130.1                  | 39.5         | 196        | 187.6 56               | .9 256   | 245.0                                  |               |
| 17              | 16.3<br>17.2 |              | 77<br>78   | 73.7<br>74.6   | 22.4<br>22.6 | 137<br>138 | 131.1<br>132.1         | 39.8<br>40.1 | 197<br>198 | 188.5 57<br>189.5 57   |          | 245.9<br>246.9                         |               |
| 19              | 18.2         | 5.5          | 79         | 75.6           | 22.9         | 139        | 133.0                  | 40.3         | 199        | 190.4 57               | .8 259   | 247.8                                  | 75.2          |
| 20              | 19.1         | 5.8          | 80         | 76.6           | 23.2         | 140        | 134.0                  | 40.6         | 200        | 191.4 58               | .1 260   | 248.8                                  |               |
| 21              | 20.1         | 6.1          | 81<br>82   | 77.5           | 23.5         | 141        | 184.9                  |              | 201        | 192.3 58               |          | 249.8<br>250.7                         |               |
| 22<br>23        | 21.1         |              | 82<br>83   | 78.5<br>79.4   |              | 142<br>143 | 135.9<br>136.8         |              | 202        | 193.3 58<br>194.3 58   |          | 250.7<br>251.7                         | 76.3          |
| 24              | 28.0         | 7.0          | 84         | 80.4           | 24.4         | 144        | 137.8                  | 41.8         | 204        | 195.2 59               | .2 264   | 252.6                                  | 76.6          |
| 25              | 23.9         | 7.3          | 85         | 81.3           | 24.7         | 145        | 138.8                  | 42.1         | 205        | 196.2 59               | .5 265   | 253.6                                  | 76.9          |
| 26<br>27        | 24.9         |              | 86<br>87   | 82.3<br>83.3   |              | 146<br>147 | 139.7<br>140.7         | 42.4         | 206<br>207 | 197.1 59<br>198.1 60   |          | 254.5<br>255.5                         |               |
| 28              | 26.8         | 8.1          | . 88       | 84.2           | 25.5         | 147        | 141.6                  | 43.0         | 207        | 198.160                |          | 256.5                                  | 77.8          |
| 29              | 27.8         | 8.4          | 89         | 85.2           | 25.8         | 149        | 142.6                  | 43.3         | 209        | 200.0 60               | .7 269   | 257.4                                  | 78.1          |
| 30              | 28.7         |              | 90         | 86.1           | 26.1         |            | 143.5                  | <del> </del> | 210        | 201.0 61               | _        | 258.4                                  | \ <del></del> |
| 31<br><b>32</b> | 30.6         |              | 91<br>92   | 87.1<br>88.0   | 26.4<br>26.7 | 151<br>152 | 144.5                  |              |            | 201.961                |          | 259.3<br>260.3                         |               |
| 33              | 31.6         |              | 93         | 89.0           | 27.0         | 152        | 145.5                  |              |            | 203.8 61               | .8 273   | 261.2                                  | 79.2          |
| 34              | 32.5         | 9.9          | 94         | 90.0           | 27.3         | 154        | 147.4                  | 44.7         | 214        | 204.8 62               | .1 274   | 262.2                                  | 79.5          |
| 35<br>36        |              | 10.2<br>10.5 | 95<br>96   | 90.9           |              |            | 148.3                  |              | 215<br>216 | 205.7 62<br>206.7 62   |          | 263.2<br>264.1                         |               |
| 37              |              | 10.5         | 97         | 92.8           |              |            | 150.2                  |              |            | 206.7 62               | .0 277   | 265.1                                  | 80.4          |
| 38              | 36.4         | 11.0         | 98         | 93.8           | 28.4         | 158        | 151.2                  | 45.9         | 218        | 208.6 63               | .3 278   | 266.0                                  | 80.7          |
| 39<br>40        |              | 11.8         | 99<br>100  | 94.7<br>95.7   |              | 159<br>160 | 152.2<br>153.1         |              | 219<br>220 | 209.6 63<br>210.5 63   |          | 267.0<br>267.9                         |               |
| $\frac{40}{41}$ | -            | 11.6         | 101        | 96.7           |              |            | 153.1                  | ·            | ·          | 210.5 64               | !!       | 268.9                                  | -             |
| 41              |              | 12.2         | 101        | 96.7           |              | 161<br>162 | 154.1                  |              | 221<br>222 | 211.564<br>212.464     |          | 269.9                                  | 81.9          |
| 43              | 41.1         | 12.5         | 103        | 98.6           | 29.9         | 163        | 156.0                  | 47.3         | 223        | 213.4 64               | .7 283   | 270.8                                  | 82.2          |
| 44              |              | 12.8         | 104        | 99.5           | 30.2         | 164        | 156.9                  |              | 224        | 214.4 65               |          | 271.8<br>272.7                         |               |
| 45<br>46        |              | 13.1         | 105        | 100,5          |              | 165<br>166 | 157.9<br>158.9         |              | 225<br>226 | 215.3 65<br>216.3 65   |          | 272.7                                  | 83.0          |
| 47              | 45.0         | 13.6         | 107        | 102.4          | 31.1         | 167        | 159.8                  | 48.5         | 227        | 217.2 65               | .9 287   | 274.6                                  | 89.5          |
| 48              | 45.9         | 13.9         | 108        | 103.3          | 31.4         | 168        | 160.8                  | 48.8         | 228        | 218.2 66               | .2 288   | 275.6                                  |               |
| 49<br>50        |              | 14.2         | 110        | 104.3<br>105.3 |              | 169<br>170 | 161.7<br>162.7         |              |            | 219.1 66<br>220.1 66   |          | 276.6<br>277.5                         |               |
| 51              |              | 14.8         |            | 106.2          |              |            | 163.6                  |              |            | 221.1 67               |          | 278.5                                  | 84.5          |
| 52              | 49.8         | 15.1         | 112        | 107.2          | 32.5         | 172        | 164.6                  | 49.9         | 232        | 222.0 67               | .3 292   | 279.4                                  | ∦ 84.8        |
| 53              | 50.7         | 15.4         | 113        | 108.1          | 32.8         | 173        | 165.6                  | 50.2         | 233        | 223.0 67               | .6 293   | 280.4<br>281.3                         | ₩ 85.1        |
| 54<br>55        |              | 15.7<br>16.0 |            | 109.1<br>110.0 |              |            | 166.5<br>167.5         |              |            | 223.9 67<br>224.9 68   |          | 282.3                                  | 85.6          |
| 56              | 53.6         | 16.3         | 116        | 111.0          | 33.7         | 176        | 168.4                  | 51.1         | 236        | 225.8 68               | .5 296   | 283.3                                  | 85.9          |
| 57              | 54.5         | 16.5         | 117        | 112.0          | 34.0         | 177        | 169.4                  | 51.4         | 237        | 226.8 68               | .8 297   | 284.2                                  | 86.2          |
| 58<br>59        |              | 16.8<br>17.1 | 118        | 112.9          |              |            | 170.3<br>171.3         |              |            | 227.8 69<br>228.7 69   |          | 285.2<br>286.1                         | 1             |
| 60              | 57.4         | 17.4         | 120        | 114.8          |              |            | 172.2                  |              |            | 229.7 69               |          | 287.1                                  | 87.1          |
| Dist.           |              | D.Lat        | Dist.      | -              |              | Dist.      | Dep.                   | <u>'</u>     | ll         | Dep. D.l               | at Dist. | Dep.                                   | D.L           |
|                 | <del></del>  |              |            | <u>-</u> -     |              |            |                        | <u> </u>     |            |                        |          | ــــــــــــــــــــــــــــــــــــــ |               |

## TABLE XII.' TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

|          |               | NAE        | ĮΕ.        | SbI            | EE.          | San        | włw.              | 1            | N6W 1      | W,               | or       | 1≟ Po      | ints.          |               |
|----------|---------------|------------|------------|----------------|--------------|------------|-------------------|--------------|------------|------------------|----------|------------|----------------|---------------|
| Dist.    | DLat          |            |            |                |              |            |                   |              |            | D.Lat            | Dep.     | Dist.      | D.Lat          | Dep.          |
| 1        | 0.9           | 0.3        | 61         | 57.4           | 20.6         | 121        | 113.9             | 40.8         | 181        | 170.4            | 61.0     | 241        | 226.9          | 81.2          |
| 2        | 1.9           | 0.7        | 62         | 58.4           | 20.9         |            | 114.9             | 41.1         | 182        | 171.4            |          | 242        | 227.9          |               |
| 3        | 2.8           | 1.0        | 63         | 59.3           |              | 123        | 115.8             | 41.4         | 183        | 172.3            |          | 243        | 228.8          |               |
| 5        | 3.8<br>4.7    | 1.3        | 64<br>65   | 60.8<br>61.2   |              | 124        | 116.8             | 41.8<br>42.1 | 184<br>185 | 173.2<br>174.2   |          | 244<br>245 | 229.7          |               |
| 6        | 5.6           | 2.0        | 66         | 62.1           | 22.2         | 126        | 118.6             |              |            | 175.1            |          | 246        | 231.6          |               |
| 7        | 6.6           | 2.4        | 67         | 63.1           | 22.6         | 127        | 119.6             | 42.8         | 187        | 176.1            |          | 247        | 232.6          |               |
| 8        | 7.5           | 2.7        | 68         | 64.0           |              | 128        | 120.5             |              | 188        | 177.0            |          | 248        | 233.5          | 83.5          |
| 9        | 8.5           | 3.0        | 69         | 65.0           |              | 129        | 121.5             | 49.5         |            | 178.0            |          | 249        | 234.4          |               |
| 10       | 9.4           | 3.4        | 70         | 65.9           | 23.6         | 130        | 122.4             | 43.8         | 190        | 178.9            | 64.0<br> | 250        | 235.4          | 84.2          |
| 11       | 10.4          | 3.7        | 71         | 66.8           | 23.9         | 131        | 123.3             | 44.1         | 191        | 179.8            |          | 251        | 236.5          |               |
| 12       | 11.3          |            | 72<br>73   | 67.8           | 24.3<br>24.6 | 132<br>133 | 124.3<br>125.2    |              |            | 180.8<br>181.7   |          | 252<br>253 | 237.5          |               |
| 14       | 13.2          |            | 74         | 69.7           | 24.9         | 134        | 126.2             |              |            | 182.7            |          |            | 239.2          |               |
| 15       | 14.1          |            | 75         | 70.6           |              | 135        | 127.1             | 45.5         |            | 183.6            |          | 255        | 240.           |               |
| 16       | 15.1          | 5.4        | 76         | 71.6           |              | 136        | 128.0             |              |            | 184.5            |          |            | 241.0          | 86.2          |
| 17       | 16.0          |            | 77         | 72.5           |              | 137        | 129.0             |              |            | 185.5            |          | 257        | 242.0          |               |
| 18       | 16.9          |            | 78         | 73.4           | 26.3         | 138        | 129.9             |              |            | 186.4            |          | 258        | 242.9          |               |
| 19       | 17.9          | 6.4        | 79<br>80   | 74.4           | 26.6<br>27.0 | 139<br>140 | 130.9             |              |            | 187.4<br>188.3   |          |            | 243.9<br>244.8 |               |
|          | <b></b>       |            |            |                |              |            |                   |              |            | -                |          | <u> </u>   | _              |               |
| 21       | 19.8<br>20.7  | 7.1        | 81<br>82   | 76.3<br>77.2   | 27.3<br>27.6 | 141        | 132.8<br>133.7    |              |            | 189.3<br>190.2   |          | 261<br>262 | 245.7<br>246.7 |               |
| 23       | 21.7          | 7.4        | 83         | 78.1           | 28.0         | 143        | 134.6             |              |            | 191.1            |          |            | 247.6          |               |
| 24       | 22.6          |            | 84         | 79.1           | 28.3         | 144        | 135.6             |              |            | 192.1            |          | 264        | 248.6          |               |
| 25       | 23.5          |            | 85         | 80.0           | 28.6         | 145        | 136.5             |              |            | 193.0            | 69.1     | 265        | 249.           |               |
| 26       | 24.5          |            | 86         | 81.0           |              | 146        | 137.5             |              | 11 .       | 194.0            |          |            | 250.5          |               |
| 27<br>28 | 25.4          |            | 87         | 81.9           |              | .147       | 138.4             |              |            | 194.9            | 69.7     | 267        | 251.4<br>252.9 |               |
| 29       | 26.4<br>27.3  | 9.4<br>9.8 | 88<br>89   | 82.9<br>83.8   | 29.6<br>30.0 | 148<br>149 | 139.9             |              | 1          | 195.8<br>196.8   | 70.1     | 268<br>269 | 253.9          |               |
| 50       | 28.2          |            | 90         | 84.7           | 30.3         | 150        | 141.2             |              | 210        | 197.7            |          | 270        | 254.2          |               |
| 31       | 29.2          | 10.4       | 91         | 85.7           | 30.7         | 151        | 142.2             | 50.9         | 211        | 198.7            | 71.1     | 271        | 255.2          | 91.3          |
| 32       | 30.1          |            | 92         | 86.6           | 31.0         |            | 143.1             |              |            | 199.6            |          |            | 256.1          |               |
| 33       | 31.1          |            | 93         | 87.6           | 31.3         | 153        | 144.1             | 51.5         | 14         | 200.5            |          | 278        | 257.0          |               |
| 34       | 32.0          |            | 94         | 88.5           | 31.7         | 154        | 145.0             |              | 214        | 201.5            |          | 274        | 258.0<br>258.9 |               |
| 35<br>86 | \$3.0<br>33.9 |            | 95<br>96   | 89.4<br>90.4   | 32.0<br>32.3 | 155<br>156 | 145.9             | 52.2<br>52.6 |            | 202.4<br>203.4   |          | 275<br>276 | 259.9          |               |
| 37       | 34.8          |            | 97         | 91.3           | , .          | 157        | 147.8             |              | 11         | 204.3            |          | 277        | 260.8          |               |
| 38       | 35.8          |            | 98         | 92.3           | 83.0         | 158        | 148.8             |              |            | 205.3            |          | 278        | 261.7          | 98.7          |
| 39       | 36.7          |            | 99         | 93.2           | 33.4         | 159        | 149.7             | 58.6         |            | 206.2            |          | 279        | 262.7          |               |
| 40       | 37.7          | 13.5       | 100        | 94.2           | 33.7         | 160        | 150.6             | <b>5</b> 3.9 | 220        | 207.1            | 74.1     | 280        | 263.6          |               |
| 41       | 38.6          |            | 101        | 95.1           | 34.0         | 161        | 151.6             | 54.2         | 221        | 208.1            |          | 281        | 264,6          |               |
| 42<br>43 | 39.5<br>40.5  |            | 102        | 96.0<br>97.0   | 34.4<br>34.7 | 162<br>163 | 152.5<br>153.5    | 54.6<br>54.9 | 222<br>223 | 209.0<br>210.0   |          | 282<br>283 | 265.5<br>266.5 |               |
| 44       | 41.4          |            | 103        | 97.9           | 35.0         | 164        | 154.4             | 55.2         | 223        | 210.9            |          | 284        | 267.4          |               |
| 45       | 42.4          |            | 105        | 98.9           | 35.4         | 165        | 155.4             |              | 225        | 211.8            |          | 285        | 268.3          |               |
| 46       | 48.3          |            | 106        | 99.8           | 35.7         | 166        | 156.3             | 55.9         | 226        | 212.8            |          | 286        | 269.3          |               |
| 47       | 44.3          |            | 107        | 100.7          | 36.0         | 167        | 157.2             |              |            | 213.7            |          | 287        | 270.2          |               |
| 48<br>49 | 45.2<br>46.1  |            | 108<br>109 | 101.7<br>102.6 | 36.4<br>36.7 | 168<br>169 | 158.2<br>159.1    | 56.6<br>56.9 |            | 214.7°<br>215.6° |          | 288<br>289 | 271.2<br>272.1 |               |
| 50       | 47.1          |            | 110        | 103.6          | 37.1         | 170        | 160.1             | 57.3         | 230        | 216.6            |          | 290        | 273.0          |               |
| 51       | 48.0          | 17 9       | 111        | 104.5          | 37.4         | 171        | 161.0             | 57.6         | 231        | 217.5            | 77 8     | 291        | 274.0          | 98.0          |
| 52       | 49.0          |            | 112        | 105.5          |              |            | 161.9             |              |            | 218.4            |          |            | 274.9          |               |
| 53       | 49.9          |            | 11         | 106.4          |              |            | 162.9             | 58.3         |            | 219.4            |          | 293        | 275.9          | 98.7          |
| .54      | 50.8          | 18.2       | 114        | 107.3          | 38.4         | 174        | 163.8             | 58.6         | 234        | 220.3            | 78.8     | 294        | 276.8          |               |
| 55<br>56 | 51.8          |            | 115        | 108.3          |              |            | 164.8             |              |            | 221.8            |          |            | 277.8          |               |
| 56<br>57 | 52.7<br>53.7  |            | 116<br>117 | 109.2<br>110.2 | 39.1<br>39.4 |            | 165.7<br>166.7    | 59.3<br>59.6 |            | 222.2 $223.1$    |          | 296<br>297 | 278.7<br>279.6 | 99.7<br>100.1 |
| 58       | 54.6          |            | 118        | 111.1          | 39.8         |            | 167.6             |              |            | 224.18           |          |            |                | 100.4         |
| 59       | <b>5</b> 5.6  | 19.9       |            | 112.0          | 40.1         | 179        | 168.5             | 60.3         |            | 225.08           |          | 299        | 281.5          | 100.7         |
| 60       | 56.5          | 20.2       |            | 113.0          |              |            | 169.5             | 60.6         |            | 226.0            |          |            | 28 <b>2.5</b>  | 101.1         |
| Dist.    | Dep.          | D.Dat      | Dist.      | Dep.           | DLat         | Dist.      | Dep.              | D.Lat        | Dist.      | Dep.             | D.lat    | Dist.      | Dep.           | D.Lat         |
|          |               | Ebn        |            | E              |              |            | S <sub>4</sub> S. |              | '6NIN,     |                  |          | Poin       | ta.            | <del></del> , |
|          |               |            | 445.       |                | 4~.          |            | -4                |              | 4-1        |                  | 4        |            |                |               |

TABLE XII.

#### TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

|             | 110                  | NNE        |          | SSI          |              |            |                |              |             | OF THE                   |            |                        | -            |
|-------------|----------------------|------------|----------|--------------|--------------|------------|----------------|--------------|-------------|--------------------------|------------|------------------------|--------------|
| Dist.       | D.Lat                |            | -        |              | Dep.         | SS         |                |              | NW,         | D.Lat Dep.               | Point      |                        | _            |
|             | <u>'</u> ;-          |            |          |              |              |            | D.Lat          |              |             |                          |            |                        |              |
| 1 2         | 0.9                  | 0.4        | 61       | 56.4         | 23.3         | 121        | 111.8          | 46.3         |             | 167.269.3                | 241        |                        | 2.2          |
| 3           | 1.8                  | 0.8        | 62<br>63 | 57.3<br>58.2 | 23.7<br>24.1 | 122<br>123 | 112.7<br>113.6 | 46.7         |             | 168.1 69.6<br>169.1 70.0 | 242<br>243 |                        | 2.6<br>3:0   |
| 4           | 3.7                  | 1.5        | 64       | 59.1         | 24.5         | 124        | 114.6          | 47.5         |             | 170.0 70.4               | 244        |                        | 3.4          |
| 5           | 4.6                  | 1.9        | 65       | 60.1         | 24.9         | 125        | 115.5          | 47.8         | 185         | 170.9 70.8               | 245        |                        | 3.8          |
| 6           | 5.5                  | 2.3        | 66       | 61.0         | 25.3         |            | 116.4          | 48.2         | 186         | 171.8 71.2               |            |                        | 1.1          |
| 7 8         | 6.5                  | 2.7        | 67       | 61.9         | 25.6         |            | 117.8          | 48.6         | 187         | 172.8 71.6               |            |                        | 1.5          |
| 9           | 7.4<br>8.5           | 3.1<br>3.4 | 68<br>69 | 62.8<br>63.7 | 26.0<br>26.4 |            | 118.3<br>119.2 | 49.0<br>49.4 | 188<br>189  | 173.7 71.9<br>174.6 72.3 |            |                        | 5.3          |
| 10          | 9.2                  | 3.8        | 70       | 64.7         | 26.8         |            | 120.1          | 49.7         | 190         | 175.572.7                |            |                        | 5.7          |
| 11          | 10.2                 | 4.2        | 71       | 65.6         | 27.2         |            | 121.0          | 50.1         | 191         | 176.5 73.1               | 251        | 231.9 96               | 5.7          |
| 12          | 11.1                 | 4.6        | 72       | 66.5         | 27.6         | 132        | 122.0          | 50.5         | 191         | 177.473.5                |            |                        | 5.4          |
| 13          | 12.0                 | 5.0        | 73       | 67.4         | 27.9         | 133        | 122.9          | 50.9         |             | 178.3 73.9               |            |                        | 6.8          |
| 14          | 12.9                 | 5.4        | 74       | 68.4         | 28.3         |            | 123.8          | 51.3         | 194         | 179.2 74.2               |            |                        | 7.2          |
| 15          | 13.9                 | 5.7        | 75       | 69.3         | 28.7         |            | 124.7          | 51.7         | 195         | 180.2 74.6               |            |                        | 7.6          |
| 16<br>17    | 14.8<br>15.7         | 6.1        | 76<br>77 | 70.2         | 29.1<br>29.5 | 136<br>137 | 125.6 $126.6$  | 52.0<br>52.4 | 196<br>197  | 181.1 75.0<br>182.0 75.4 | 256<br>267 |                        | 8.0<br>8.3   |
| 18          | 16.6                 | 6.9        | 78       | 72.1         | 29.8         | 138        | 127.5          | 52.8         |             | 182.975.8                |            |                        | 3.7          |
| i9          | 17.6                 | 7.3        | 79       | 73.0         | 30.2         | 139        | 128.4          | 53 2         | 199         | 183.9 76.2               |            |                        | 9.1          |
| 20          | 18.5                 | 7.7        | 80       | 73.9         | 80.6         |            | 129.3          | 53.6         | <b>20</b> 0 | 184.8 76.5               |            | 240.2 99               | 9.5          |
| 21          | 19.4                 | 8.0        | .81      | 74.8         | 31.0         | 141        | 130.3          | 54.0         | 201         | 185.7 76.9               | 261        | 241.1 99               | 9.9          |
| 22          | 20.3                 | 8.4        | 82       | 75.8         | 31.4         | 142        | 131.2          | 54.3         |             | 186.6 77.3               |            | 245.1 100              | 0.5          |
| 23          | 21.2                 | 8.8        | 83       | 76.7         | 31.8         | 143        | 132.1          | 54.7         |             | 187.5 77.7               |            | 243.0 100              |              |
| 24          | 22.2                 | 9.2        | 84       | 77.6         | 32.1         | 144        | 133.0          | 55.1         |             | 188.5 78.1               | 264        | 243.9 101              |              |
| 25          | 23.1                 | 9.6        | 85       | 78.5         | 32.5         | 145        | 134.0          | 55.5         |             | 189.4 78.5               | 265        | 244.8 101<br>245.8 101 |              |
| 26<br>27    | 24.0<br>24.9         | 9.9        | 86<br>87 | 79.5<br>80.4 | 32.9<br>33.3 | 146<br>147 | 134.9<br>135.8 | 55.9<br>56.3 | 206<br>207  | 190.3 78.8<br>191.2 79.2 | 266<br>267 | 246.7 10               |              |
| 28          | 25.9                 | 10.7       | 88       | 81.3         | 33.7         | 148        | 136.7          | 56.6         | 208         | 192.2 79.6               | 268        | 247.6 10               |              |
| 29          | 26.8                 | 11.1       | 89       | 82.2         | 34.1         | 149        | 137.7          | 57.0         | 209         | 193.180.0                | 269        | 248.5 10               | 2.9          |
| 30          | 27.7                 | 11.5       | 90       | 83.1         | 34.4         | 150        | 138.6          | 57.4         | 210         | 194.0 80.4               | 270        | 249.4 10               | 3.3          |
| 31          | 28.6                 | 11.9       | 91       | 84.1         | 34.8         | 151        | 139.5          | 57.8         | 211         | 194.9 80.7               | 271        | 250.4 10:              | 3.7          |
| 32          | 29.6                 |            | 92       | 85.0         | 35.2         | 152        | 140.4          | 58.2         | 212         | 195.98h1                 | 272        | 251.3 10               | 4.1          |
| <b>\$</b> 3 | 30.5                 | 12.6       | 93       | 85.9         | 35.6         | 153        | 141.4          | 58.6         | 213         | 196.881.5                | 273        | 252.210                |              |
| 34          | 31.4                 |            | 94       | 86.8         | 36.0         | 154        | 142.3          | 58.9         | 214         | 197.781.9                | 274        | 253.110                | 2.9          |
| 35<br>36    | 32.3                 |            | 95<br>96 | 87.8         | 36.4<br>36.7 | 155<br>156 | 143.2<br>144.1 | 59.3<br>59.7 | 215<br>216  | 198.6 82.5<br>199.6 82.7 | 275<br>276 | 254.110.<br>255.010    |              |
| 37          | 33. <b>3</b><br>34.2 |            | 97       | 88.7<br>89.6 | 37.1         | 157        | 145.0          |              | 217         | 200.5 83.0               | 277        | 255.9 10               |              |
| 36          | 35.1                 | 14.5       | •        | 90.5         | 37.5         | 158        | 146.0          |              | 218         | 201.4 83.4               | 278        | 256.8 10               |              |
| 39          | 36.0                 |            | 99       | 91.5         | 37.9         | 159        | 146.9          | 60.8         | 219         | 202.3 83.8               |            | 257.8 10               |              |
| 40          | 37.0                 | 15.3       | 100      | 92.4         | 38.3         | 160        | 147.8          | 61.2         | 220         | 203.3 84.2               | 280        | 258.7 10               | 7.2          |
| 41          | 37.9                 | 15.7       | 101      | 98.3         | 38.7         | 161        | 148.7          | 61.6         | 221         | 204.284.6                | 281        | 259.6 10               | 7.5          |
| 42          | 38.8                 |            | 102      | 94.2         |              | 162        | 149.7          | 62.0         | 222         | 205.185.0                |            | 260.5 10               | 7.9          |
| 43          | 39.7                 | 16.5       | 103      | 95.2         |              | 163        | 150.6          |              |             | 206.085.8                |            | 261.5 10               | 18.3<br>19.7 |
| 44<br>45    | 40.7                 |            | 104      | 96.1<br>97.0 |              | 164<br>165 | 151.5<br>152.4 |              | 224<br>225  | 206.9 85.7<br>207.9 86.1 |            | 262.4 10               |              |
| 46          | 41.6<br>42.5         |            |          | 97.0         |              |            | 153.4          | 63.5         | 226         | 208.886.5                |            | 264.2 10               |              |
| 47          | 43.4                 |            |          | 98.9         |              |            | 154.3          | 63.9         | 227         | 209.7 86.9               |            | 265.2 10               | 9.8          |
| 48          | 44.3                 | 18.4       | 108      | 99.8         | 41.3         | 168        | 155.2          | 64.3         | 228         | 210.6 87.3               | 288        | 266.1 11               | 0,4          |
| 49          | 45.9                 |            |          | 100.7        |              |            | 156.1          | 64.7         | 229         | 211.687.6                |            | 267.011                |              |
| 50          | 46.2                 | 19.1       | 110      | 101.6        | 42.1         | 170        | 157.1          | 65.1         | 230         | 212.5 88.0               | 290        | _                      |              |
| 51          | 47.1                 |            |          | 102.6        |              |            | 158.0          |              | 231         | 213.4 88.4               |            | 268.8 11               | 1.4          |
| 52          |                      | 19:9       | 11       |              |              | 172        |                |              |             | 214.3 88.8               |            | 269.8 11               | 0.1          |
| 53          | 49.0                 |            |          | 104.4        |              |            | 159.8          |              |             | 215.8 89.2               |            | 270.7.11<br>271.611    |              |
| 55<br>55    | 49.9                 |            |          | 105.9        |              |            | 160.8          |              |             | 216.2 89.5<br>217.1 89.9 |            | 272.511                |              |
| 56          | 50.8                 |            |          | 107.2        |              |            | 162.6          |              |             | 218.0 90.3               |            | 273.511                | 3.8          |
| 57          | 52.7                 |            |          | 108.1        |              |            | 168.5          |              |             | 219.0 90.7               |            | 274.4 11               | 3.7          |
| 58          | 53.6                 | 22.2       | 118      | 109.0        | 45.2         |            | 164.5          |              |             | 219.991.1                | 298        | 275.3 11               | 4.0          |
| 59          | 54.5                 |            |          | 109.9        |              |            | 165.4          |              |             | 220.8 91.5               |            |                        |              |
| 60          | .,                   | 23.0       | 11       | 110.9        | 1            |            | 166.3          |              | 41          | 221.7 91.8               |            |                        |              |
| Dist        | Dep.                 | D.Lat      | Dist.    | Dep.         | D.Lat        | Dist       | Dep.           | D.Lat        | Dist.       | Dep. D.la                | Dist       | Dep. D.                | JAK.         |
|             |                      |            |          |              |              |            |                |              |             |                          |            |                        |              |

TABLE XII.
TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

| -                        |              | NN                  | EŁE.       | SSE L.                   |             | SWAW           | V.           | NNU        | v <sub>ž</sub> w, | 0            | r 21 I     | Pointe      |                |
|--------------------------|--------------|---------------------|------------|--------------------------|-------------|----------------|--------------|------------|-------------------|--------------|------------|-------------|----------------|
| Dist I                   | D.Lat.       | Dep.                |            | D.Lat  Dep.              |             |                |              |            |                   |              |            |             | Dien           |
|                          |              |                     |            |                          | <del></del> |                |              |            |                   |              |            | ļ           |                |
| 1 2                      | 0.9          | 0.4                 | 61         | 55.1 26.1<br>56.0 26.5   | 121<br>122  | 109.4          | 51.7<br>52.2 | 181        | 163.6<br>164.5    | 77.4<br>77.8 | 241<br>242 |             | 103.0          |
| 3                        | 2.7          | 1.8                 | 63         | 57.0 26.9                |             | 110.3          |              | 183        | 165.4             | 78:2         | 243        |             | 103.5          |
| 41                       | 3.6          | 1.7                 | 64         | 57.9 27.4                |             | 112.1          |              |            | 166.3             | 78.7         | 244        |             | 104.3          |
| 5                        | 4.5          | 2.1                 | 65         | 58.8 27.8                | 125         | 113.0          |              | 185        | 167.2             | 79.1         | 245        |             | 104.8          |
| 6                        | 5.4          | 2.6                 | 66         | 59.7 28.2                |             | 113.9          |              | 186        | 168.1             | 79.5         | 246        |             | 105.2          |
| 7                        | 6.8          | 3.0                 | 67         | 60.6 28.6                | 127         | 114.8          |              |            | 169.0             | 80.0         | 247        |             | 105.6          |
| 8                        | 7.2<br>8.1   | 3.4<br>3.8          | 68         | 61.5 29.1<br>62.4 29.5   | 128         | 115.7<br>116.6 |              | 188        | 169,9<br>170.9    | 80.4         | 248        |             | 106.0          |
| 10                       | 9.0          | 4.3                 | 70         | 63.329.9                 | 130         | 117.5          |              | 190        | 171.8             | 81.2         | 250        |             | 106.5<br>106.9 |
| -                        |              |                     |            |                          |             |                | II           |            | <u> </u>          |              |            | ļ,          |                |
| 11                       | 9.9          | 4.7                 | 71 72      | 64.230.4                 | 131         | 118.4          |              | 191        | 172.7             | 81.7         | 251        |             | 107.3          |
| 12<br>13                 | 10.8         | 5.1<br>5.6          | 78         | 65.130.8<br>66.031.2     | 132         | 119.3          |              | 192        | 173.6<br>174.5    | 82.1<br>82.5 | 252<br>253 |             | 107.7          |
| 14                       | 12.7         | 6.0                 | 74         | 66.931.6                 | 134         | 121.1          |              |            | 175.4             | 82.9         | 254        |             | 108.2<br>108.6 |
| 15                       | 13.6         | 6.4                 | 75         | 67.8 32.1                |             | 122.0          | 57.7         | 195        | 176.3             | 83.4         | 255        |             | 109.0          |
| 16                       | 14.5         | 6.8                 | 76         | 68.7 32.5                |             | 122.9          |              | 196        | 177.2             | 83.8         | 256        |             | 109.5          |
| 17                       | 15.4         | 7.3                 | 77         | 69.6 32.9                |             | 123.8          |              | 197        | 178:1             | 84.2         | 257        |             | 109.9          |
| 18                       | 16.3         | 7.7                 | 78         | 70.538.8                 | 1           | 124.8          | 59.0         | 198        | 179.0             | 84.7         | 258        |             | 110.3          |
| 19                       | 17.2         | 8.1                 | 79         | 71.433.8                 | 189         | 125.7          | 59.4         | 199        | 179.9             | 85.1         | 259        |             | 110.7          |
| 20                       | 18.1         | 8.6                 | - 80       | 72.8 34.2                | 140         | 126.6          | 59.9         | 200        | 180.8             | 85.5         | 260        | 235.0       | 111.2          |
| 21                       | 19.0         | 9.0                 | 81         | 73 2 34.6                | 141         | 1275           | 60.3         | 201        | 181.7             | 85.9         | 261        | 235.9       | 111.6          |
| 22                       | 19.9         | 9.4                 | 82         | 74.1 35.1                |             | 128.4          |              |            | 182.6             |              | 262        |             | 112.0          |
| 23                       | 90.8         | 9.8                 | 83         | 75.0 35.5                |             | 129.3          |              |            | 188.5             |              | 263        |             | 112.4          |
| 24                       |              | 10.3                | 84<br>85   | 75.935.9<br>76,836.3     |             | 130.2<br>131.1 |              | 204<br>205 | 184.4<br>185.3    | 87.2         | 264        |             | 112.9          |
| 25<br>26                 |              | 11.1                | 86         | 77.736.8                 | 145         | 132.0          |              | 206        | 186.2             | 87.6<br>88.1 | 265 ·      |             | 118.3          |
| 27                       |              | 11.5                | 87         | 78.6 37.2                |             | 132.9          | 62.9         | 207        | 187.1             | 88.5         | 267        |             | 118.7<br>114.2 |
| 28                       |              | 12.0                | 88         | 79.637.6                 | 148         | 133.8          |              | 208        | 188.0             |              | 268        |             | 114.6          |
| 29                       | 26.2         | 12.4                | 89         | 80.5 38.1                | 149         | 184.7          | 63.7         | 209        | 188.9             | 89.4         | 269        |             | 115.0          |
| 30                       | 27.1         | 12.8                | 90         | 81.4 38.5                | 150         | 135.6          | ,64.1        | 210        | 189.8             | 89.8         | 27.0       |             | 115.4          |
| 31                       | 28.0         | 13.3                | 91         | 82.3 38.9                | 151         | 136.5          | 64 6         | 211        | 190.7             | 90.2         | 271        | 245 0       | 115.9          |
| 82                       | 28.9         | 18.7                | 92         | 83.239.3                 |             | 137.4          |              |            | 191.6             | 90.6         | 272        |             | 116.3          |
| 83                       | 29.8         | 14.1                | 93         | 84.1 39.8                | 158         | 138.3          | 65.4         | 213        | 192.5             | 91.1.        | 273        |             | 116.7          |
| 34                       | 30.7         | 14.5                | 94         | 85.0 40.2                |             | 139.2          |              | 214        | 198.5             | 91.5         | 274        |             | 117.2          |
| 35                       |              | 15.0                | . 95       | 85.9 40.6                | 155         | 140.1          | 66.3         | 215        | 194.4             |              | 275        |             | 117.6          |
| 56                       |              | 15.4<br>15.8        | 96<br>97   | 86.8 41.0<br>87.7 41.5   | 156         | 141.0          | 66.7<br>67.1 | 216.       | 195.3<br>196.2    | 92.4         | 276        |             | 118.0          |
| 37<br>38                 |              | 16.2                | . 98       | 88.6 41.9                | 157         | 141.9<br>142.8 | 67.6         | 217<br>218 | 197.1             | 92.8<br>93.2 | 277<br>278 |             | 118.4<br>118.9 |
| 39                       | 35.8         | 16.7                | 99         | 89.5 42.3                | 159         | 149.7          |              | 219        | 198.0             | 93.6         | 279        |             | 119.3          |
| 40                       |              | 17.1                | 100        | 90.4 42.8                |             | 144.6          | 68.4         | 220        | 198.9             | 94.1         | 280        |             | 119.7          |
| 41                       | 37.1         | 17.5                | 101        | 91.343.2                 | 161         | 145.5          | 68.8         | 221        | 199.8             | 94,5         | 001        | <del></del> |                |
| 42                       |              | 18.0                | 102        | 92.248.6                 |             | 146.4          | 69.3         | 221        | 200.7             | 94,9         | 281        |             | 120.1<br>120.6 |
| 43                       |              | 18.4                | 103        | 93.144.0                 | 163         | 147.4          | 69.7         | 223        | 201.6             | 95.8         | 283        |             | 121.0          |
| 44                       | 39.8         | 18.8                | 104        | 94.0 44.5                |             | 148.3          | 70.1         | 224        | 202.5             | 95,8         | 284        |             | 121.4          |
| 45                       | 40.7         | 19.2                | 105        | 94.9 44.9                | 165         | 149.2          | 70.5         | 225        | 203.4             | 96.2         |            | 257.6       | 121.9          |
| 46                       | 41.6         | 19.7                | 106        | 95.8 45.8                | 1           | 150.1          | 71.0         | 226        | 204.3             | 96.6         | 286        |             | 122.3          |
| 47                       | 42.5         | 20.1                | 107        | 96.745.7<br>97.646.2     | 167         | 151.0          | 71,4         |            | 205.2             | 97,1         | 287        |             | 122.7          |
| 48<br>49                 |              | $\frac{20.5}{21.0}$ | 108<br>109 | 98.5-16.6                | 168         | 151.9<br>152.8 | 71.8         | 228<br>229 | 206.1<br>207.0    | 97.5<br>97.9 | 288        |             | 128.1          |
| 50                       |              | 21.4                | 110        | 99.447.0                 |             | 158.7          | 72.7         | 230        | 207.9             | 98.9         | 289        |             | 128.6<br>124.0 |
|                          |              |                     |            |                          |             |                |              |            |                   |              |            | <del></del> |                |
| 51<br>50                 | 46.1<br>47.0 | 21.8                | 111        | 100.3 47.5<br>101.2 47.9 |             | 154.6          |              | 231        | 208.8<br>209.7    | 98.8         | 291        |             | 124.4          |
| <i>5</i> 2<br><i>5</i> 3 | 47.0         |                     |            | 102.2 48.3               |             | 155.5<br>156.4 |              |            | 210.6             |              | 292<br>293 |             | 124.8<br>125.3 |
| 54                       | 48.8         |                     |            | 103.1 48.7               |             | 157.3          |              | 234        |                   | 100.0        |            | 265.8       |                |
| 55                       | 49.7         |                     |            | 104.6 49.2               |             | 158.2          |              |            |                   | 100.5        |            |             | 126.1          |
| 56                       |              | 23.9                | 116        | 104.9 49.6               | 1           | 159.1          |              | 236        |                   | 100.9        |            |             | 126.6          |
| 57                       | 51.5         |                     | 117        | 105,8 50.0               | 177         | 160.0          | 75.7         | 237        | 214.2             | 101.3        | 297        |             | 127.0          |
| 58                       | 52.4         |                     | 118        | 106.7 50.5               |             | 160.9          |              | 238        |                   | 101.8        |            |             | 127.4          |
| . 59                     | 53.3         |                     | 119        | 107.6 50.9               |             | 161.8          |              |            |                   | 102.2        |            |             | 127.8          |
| 60                       | 54.2         | 25.7                | . 120      | 108.551.8                | <u></u>     | 162.7          |              | 240        | 217.0             | 102.6        | 900        | 271.2       | 128.3          |
| Dist,                    | Dep.         | D.Lat               | Dist.      | Dep. D.lat               | Dist.       | Dep.           | D.Lat        | Dist.      | Dep.              | D.Lat        | Dist.      | Dep.        | D.Lat          |
|                          |              | METER               |            | CRARIE                   |             | 117/11/73      |              |            | Tair an           | ,            |            | 1 10        |                |
|                          |              |                     |            |                          |             |                |              |            |                   |              |            |             |                |

TABLE XII.
TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

| -        | IK           | AVER         |            |              |              |            |                |      |                     |                   |              |            |   |
|----------|--------------|--------------|------------|--------------|--------------|------------|----------------|------|---------------------|-------------------|--------------|------------|---|
| 138.5    | 15.          |              | EĮE.       |              | SEĮE.        |            | SWJW           |      |                     | W <sub>2</sub> W, |              |            | Points.                                   |
| Dist     | D.Lat        | Dep.         | Dist.      | D.Lat        | Dep.         | Dist.      | D.Lat          | рер. | D18t.               | D.Lat             | Dep.         | Dist.      | D.Lat Dep                                 |
| 1        | 0.9          |              | 61         | 53.8         |              | 121        | 106.7          |      |                     | 159.6             | 85.8         |            | 212.5 119.                                |
| 2        | 1.8          |              | 62         | 54.7         |              | 122        | 107.6          |      |                     | 160.5             |              |            | 213.4 114.                                |
| \$<br>4  | 2.6          |              | 63<br>64   | 55.6<br>56.4 |              | 123        | 108.5          |      |                     | 161.4<br>162.3    |              |            | 214.3 114.<br>215.2 115.                  |
| 5        | 3.5<br>4.4   |              | 65         | 57.3         |              | 125        | 110.2          |      |                     | 163.2             |              |            | 216.1 115.                                |
| 6        | 5.3          |              | 66         | 58.2         |              | 126        | 111.1          |      |                     | 164.0             |              |            | 217.0 116.                                |
| 7        | 6.2          |              | 67         | 59.1         | 31.6         | 127        | 112.0          |      |                     | 164.9             | 88.2         |            | 217.8 116.                                |
| ્8       | 7.1          |              | 68         | 60.0         |              | 128        | 112.9          |      |                     | 165.8             |              | 248        | 218.7 116.                                |
| 10       | 7.9          |              | 69         | 60.9         | 32.5         | 129        | 113.8          |      | 189<br>1 <b>9</b> 0 | 166.7             | 89.1         |            | 219.6 117.                                |
|          | 8.8          | 4.7          | 70         | 61.7         | 33.0         | 130        | 114.6          |      |                     | 167.6             | 89.6         | 250        | 220.5 117.                                |
| 11       | 9.7          | 5.2          | 71         | 62.6         | 33.5         | 131        | 115.5          |      | 191                 | 168.4             | 90.0         | 251        | 221 . 4 118.                              |
| 12       | 10.6         | 5.7          | 72         | 63.5         | 33.9         | 132        | 116.4          |      | 192                 | 169.3             |              |            | 222.2 118.                                |
| 13<br>14 | 11.5         | 6.1<br>6.6   | 73<br>74   | 64.4         | 34.4<br>34.9 | 133<br>134 | 117.3<br>118.2 |      | 193<br>194          | 170.2 $171.1$     | 91.0         | 253        | 223.1 119.                                |
| 15       | 12.3<br>13.2 | 7.1          | 75         | 66.1         | 35.4         | 135        | 119.1          |      | 195                 | 172.0             | 91.5<br>91.9 | 254<br>255 | 224.0 119.<br>224.9 120.                  |
| 16       | 14.1         | 7.5          | 76         | 67.0         | 35.8         | 136        | 119.9          |      |                     | 172.9             | 92.4         | 256        | 225.8 120.                                |
| 17       | 15.0         | 8.0          | 77         | 67.9         | 36.3         | 137        | 120.8          | 64.6 | 197                 | 173.7             | 92.9         | 257        | 226.7 121.                                |
| 18       | 15.9         | 8.5          | 78         | 68.8         |              | 138        | 121.7          |      |                     | 174.6             | 93.3         | 258        | 227.5 121.6                               |
| 19       | 16.8         | 9.0          | 79         | 69.7         | 37.2         | 139        | 122.6          |      | 199                 | 175 5             | 98.8         |            | 228.4 122.                                |
| 20       | 17.6         | 9.4          | 80         | 70.6         | 37.7         | 140        | 128.5          | 00.0 | 200                 | 176.4             | 94.8         | 260        | 229.3 122.6                               |
| 21       | 18.5         | 9.9          | 81         | 71.4         | 38.2         | 141        | 124.4          |      | 201                 | 177.3             | 94.8         | 261        | 230.2 123.0                               |
| 22       | 19.4         | 10.4         | 82         | 72.3         | 38.7         | 142        | 125.2          |      |                     | 178.1             | 95.2         | 262        | 231.1 123.                                |
| 23       | 20.3         | 10.8         | 83         | 73.2         | 89.1         | 143        | 126.1          |      | 203                 | 179.0             | 95.7         | 263        | 231 . 9 124.                              |
| 24<br>25 | 21.2         | 11.3         | 84<br>85   | 74.1<br>75.0 | 39.6         | 144<br>145 | 127.0 $127.9$  |      | 204<br>205          | 179.9<br>180.8    | 96.2         | 264        | 232.8 124.                                |
| 26       | 22.0<br>22.9 | 11.8<br>12.3 | 86         | 75.8         | 40.1         |            | 128.8          |      | 206                 | 181.7             | 96.6<br>97.1 | 265<br>266 | 233.7 124.<br>234.6 125.                  |
| 27       | 23.8         | 12.7         | 87         | 76.7         | 41.0         |            | 129.6          |      | 207                 | 182.6             | 97.6         | 267        | 235.5 125.                                |
| 28       | 24.7         | 13.2         | 88         | 77.6         | 41.5         | 148        | 130.5          | 69 8 | 208                 | 183.4             | 98.1         | 268        | 236 . 4 126.                              |
| 29       | 25.6         | 13.7         | 89         | 78.5         | 42.0         | 149        | 131.4          | 70.2 | 209                 | 184.3             | 98.5         | 269        | 237.2 126.                                |
| 30       | 26.5         | 14.1         | 90         | 79.4         | 42.4         | 150        | 132.3          | 70.7 | 210                 | 185.2             | 99.0         | 270        | 238.1 127.                                |
| 31       | 27.3         | 14.6         | 91         | 80.3         | 42.9         | 151        | 133.2          | 71.2 | 211                 | 186.1             | 99.5         | 271        | 239.0 127.                                |
| 32       | 28.2         | 15.1         | 92         | 81.1         | 43.4         |            | 134.1          |      | 212                 |                   | 99.9         | 272        | 239.9 128.                                |
| 33       | 29.1         | 15.6         | 93         | 82.0         | 43.8         |            | 134.9          |      |                     | 187.8             |              |            | 240.8 128.                                |
| 34       | 30.0         |              | 94         | 82.9         | 44.3         |            | 135.8          |      |                     | 188.7             |              | 274        | 241.6 129.                                |
| 35<br>36 | 30.9<br>31.7 | 16.5<br>17.0 | 95<br>96   | 83.8<br>84.7 | 44.8<br>45.3 |            | 136.7<br>137.6 |      | 215<br>216          | 189.6<br>190.5    |              | 275<br>276 | 242.5 129.0<br>243.4 130.1                |
| 37       | 32.6         | 17.4         | 97         | 85.5         | 45.7         |            | 138 5          |      | 217                 | 191.4             |              | 277        | 244.3 130.                                |
| 38       | 33.5         | 17.9         | 98         | 86.4         | 46.2         | 158        | 139.3          | 74.5 | 218                 | 192.3             |              | 278        | 245.2 191.0                               |
| 39       | 34.4         | 18.4         | 99         | , 87.3       | 46.7         |            | 140.2          |      | 219                 | 198.1             | 103.2        | 279        | 246.1 131.5                               |
| 40       | 35.3         | 18.9         | 100        | 88.2         | 47.1         | 160        | 141.1          | 75.4 | 220                 | 194.0             | 103.7        | 280        | 246.9 132.0                               |
| 41       | 36.2         | 19.3         | 101        | 89.1         | 47.6         | 161        | 142.0          | 75.9 | 221                 | 194.9             | 104.2        | 281        | 247.8 132.                                |
| 42       | 37.0         | 19.8         | 102        | 90.0         | 48.1         | 162        | 142.9          |      |                     | 195.8             | 104.7        | 282        | 248.7 132.                                |
| 43       | 37.9         | <b>£</b> 0.3 | 103        | 90.8         | 48.6         | 163        | 143.8          |      | 223                 | 196.7             |              | 283        | 249.6 133.                                |
| 44       | 38.8         | 20.7         | 104        | 91.7         | 49.0         |            | 144.6          |      | 224                 | 197.6             |              | 284        | 250.5 133.                                |
| 45<br>46 | 39.7<br>40.6 | 21.2<br>21.7 | 105<br>106 | 92.6<br>93.5 | 49.5<br>50.0 |            | 145.5<br>146.4 |      | 225<br>226          | 198.4             |              | 285<br>286 | 251.3 194.<br>252. <b>2</b> 1 <b>3</b> 4. |
| 47       | 41.5         | 22.2         | 107        | 93.3         | 50.4         | 167        | 147.3          | 78.7 | 227                 | 200 · 2           |              |            | 253.1 135.                                |
| 48       | 42.3         | 22.6         | 108        | 95.2         | 50.9         | 168        | 148.2          | 79.2 | 228                 | 201.1             |              |            | 254.0 135.                                |
| 49       | 43.2         | 23.1         | 109        | 96.1         | 51.4         | 169        | 149.0          | 79.7 | 229                 | 202.0             | 107.9        |            | 254.9 196.                                |
| 50       | 44.1         | 23.6         | 110        | 97.0         | 51.9         | 170        | 149.9          | 80.1 | 230.                | 202.8             | 108.4        | 290        | 255 8 136.                                |
| 51       | 45.0         | 24.0         | 111        | 97.9         | 52.3         | 171        | 150.8          | 80.6 | 231                 | 203.7             | 108.9        | 291        | 256.6 137.5                               |
| 52       | 45.9         |              |            | 98.8         |              |            | 151.7          |      |                     | 204.6             |              |            | 257.5 137.6                               |
| 53       | 46.7         | 25.0         | 113        | 99.7         | 53.3         |            | 152.6          |      |                     | 205.5             |              |            | 258.4 138.1                               |
| 54       | 47.6         |              |            | 100.5        | 53.7         |            | 153.5          |      |                     | 206.4             |              |            | 259.3 138.6                               |
| 55       | 48.5         | 25.9         |            | 101.4        | 54.2         |            | 154.3          |      | 235                 | 207.3             |              |            | 260.2 139.1                               |
| 56<br>57 | 49.4<br>50.8 | 26.4<br>26.9 |            | 102.3        | 54.7<br>55.2 | 176<br>177 | 155.2          |      |                     | 208.1             |              |            | 261.0 139.5<br>261.9 140.0                |
| 58       | 51.2         | 27.3         |            | 103.2        | 55.6         |            | 157.0          |      |                     | 209.9             |              |            | 262.8.140.5                               |
| 59       | 52.0         |              |            | 104.9        |              |            | 157.9          |      | 239                 | 210.8             | 112.7        |            | 263.7;140.9                               |
| 60       | 52.9         | 28.3         |            | 105.8        | 56.6         |            | 158.7          |      |                     | 211.7             |              |            | 264.6 141.4                               |
| Dist.    | Den.         | DLat         | Dist.      | Dep.         | D.I.at       | Dist.      | Dep.           | DJat |                     | Dep.              |              | Dist.      | Dep. D.Lat                                |
| 2.06.(   |              | BEJE.        |            | SE&E 41      |              |            | waw.           |      |                     | wiw,              |              | or 5½      |   |
|          |              |              | -          | 21012        |              | J 11 D     | 2 ** •         |      | 41 110              | ., 2 ,,           |              | 4 77       |   |

#### TABLE XII. TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

|                |              | NNE 3        |                  | SSE            |              |            | V <sub>3</sub> W.        | NNW:       |                         |              |                    |                |       |
|----------------|--------------|--------------|------------------|----------------|--------------|------------|--------------------------|------------|-------------------------|--------------|--------------------|----------------|-------|
| Dist.          | D.Lat        |              |                  | D.Lat          |              |            | D.Lat Dep.               |            | DL.at                   |              | 24 Po              |                |       |
| 11             |              |              |                  |                |              |            |                          |            | <del>`</del>            | <u> </u>     | Dist.              | D. Lat         | Dep.  |
| 1 2            | 0.9          | 0.5          | 61<br>62         | 52.8           | 31.4         | 121        | 103.8 62.2               | 181        | 155.2                   |              | 241                |                | 123.9 |
| 3              | 2.6          | 1.5          | 63               | 53.2<br>54.0   | 31.9<br>32.4 | 122<br>123 | 104.6 62.7<br>105.5 63.2 | 182<br>183 | 156.1<br>157.0          | 93.6<br>94.1 | 24 <b>2</b><br>243 | 207.6          |       |
| 4              | 3.4          | 2.1          | 64               | 54.9           | 82.9         | 124        | 106.463.7                | 184        | 157.8                   | 94.6         | 243                | 208.4<br>209.3 |       |
| 5              | 4,3          | 2.6          | 65               | 55.8           | 33.4         | 125        | 107.264.3                |            | 158.7                   | 95.1         | 245                | 210.1          |       |
| 6              | , 5.1        | 3.1          | 66               | 56.6           | 33.9         | 126        | 108.1 64.8               | 186        | 159.5                   | 95.6         | 246                | 211.0          | 126.5 |
| 8              | 6.0<br>6.9   | 3.6<br>4.1   | 67               | 57.5           | 34.4         | 127        | 108.965.3                | 187        | 160.4                   | 96.1         | 247                | 211.9          |       |
| 9              | 7.7          | 4.6          | 68<br>69         | 58.9<br>59.2   | 95.0<br>95.5 | 128<br>129 | 109.8 65.8<br>110.6 66.3 | 188        | 161.3<br>162.1          | 96.7<br>97.2 | 248<br>249         | 212.7          |       |
| 10             | 8.6          | 5.1          | 70               | 60.0           | 36.0         | 130        | 111.566.8                | 190        | 163.0                   | 97.7         | 250                | 213.6 $214.4$  |       |
| 11             | 9.4          |              |                  |                |              |            |                          |            | <u> </u>                | '            |                    |                |       |
| 12             | 10.3         | 5.7<br>6.2   | 71<br>72         | 60.9<br>61.8   | 36.5<br>37.0 | 131<br>132 | 112.4 67.3               | 191        | 163.8                   | 98.2         | 251                | 215.3          |       |
| 13             | 11.2         | 6.7          | 73               | 62.6           | 37.5         | 132        | 113.267.9<br>114.168.4   | 192<br>193 | 164.7<br>165.5          | 98.7<br>99.2 | 252<br>258         | 216.1 $217.0$  |       |
| 14             | 12.0         | 7.2          | 74               | 63.5           | 38.0         | 134        | 114.968.9                | 194        | 166.4                   |              | 254                | 217.9          |       |
| 15             | 12.9         | 7.7          | 75               | 64.3           | 38.6         | 135        | 115.869.4                | 195        | 167.3                   |              | 255                | 218.7          |       |
| 16             | 13.7         | 8.2          | 76               | 65.2           | 39.1         | 136        | 116.7 69.9               | 196        | 168.1                   |              |                    | 219.6          |       |
| 17<br>18       | 14.6<br>15.4 | 8.7          | 77.              | 66.0           | 39.6         | 137        | 117.570.4                | 197        | 169.0                   |              | 257                | 220.4          |       |
| 19             | 16.3         | 9.3<br>9.8   | 78<br>79         | 66.9<br>67.8   | 40.1         | 138<br>139 | 118.470.9<br>119.271.5   | 198<br>199 | 169.8<br>170.7          |              | 258                | 221.3          |       |
| 20             | 17.2         | 10.3         | 80               | 68.6           | 41.1         | 140        | 120.172.0                | 200        | 171.5                   |              | 259<br>260         | 222.2<br>223.0 |       |
| 21             |              |              |                  |                |              |            |                          |            | l!                      | ——)          |                    | !              |       |
| 22             | 18.0<br>18.9 | 10.8         | 81<br>8 <b>2</b> | 69.5           | 41.6<br>42.2 | 141        | 120.972.5                | 201        | 172.4                   |              | 261                | 223.9          |       |
| 23             | 19.7         | 11.8         | 89               | 70.3<br>71.2   | 42.7         | 142        | 121.873.0<br>122.773.5   |            | 173.3<br>174.1          |              | 262<br>263         | 224.7<br>225.6 |       |
| 24             | 20.6         | 12.3         | 84               | 72.0           | 48.2         | 144        | 123.574.0                |            | 175.0                   |              |                    | 226.4          |       |
| 25             | 21.4         | 12.9         | 85               | 72.9           | 48.7         | 145        | 124.474.5                | 205        | 175.8                   |              | 265                | 227.3          |       |
| 26             | 22.3         | 13.4         | 86               | 73.8           | 44.2         | 146        | 125.275.1                | 206        | 176.7                   | 105.9        | 266                | 228.2          |       |
| 27<br>28       | 23.2         | 13.9         | 87               | 74.6           | 44.7         | 147        | 126.1 75.6               | 207        | 177.5                   |              |                    | 229.0          |       |
| 29             | 24.0<br>24.9 | 14.4<br>14.9 | 88<br>89         | 75.5<br>76.3   | 45.2<br>45.8 | 148<br>149 | 126.976.1                | 208<br>209 | 178.4                   |              | 268                | 229.9          |       |
| 30             | 25.7         | 15.4         | 90               | 77.2           | 46.3         | 150        | 127.876.6<br>128.777.1   | 210        | 179.3<br>180.1          |              | 269<br>270         | 230.7<br>231.6 |       |
| 31             |              |              | <u> </u>         |                |              |            |                          |            |                         |              |                    | <u> </u>       |       |
| 32             | 26.6<br>27.4 | 15.9<br>16.5 | 91<br>9 <b>2</b> | 78.1<br>78.9   | 46.8         | 151        | 129.577.6                | 211        | 181.0                   |              | 271                | 232.4          |       |
| 33             | 28.3         | 17.0         | 93               | 79.8           | 47.3<br>47.8 | 152<br>153 | 130.478.1<br>131.278.7   |            | 181.8<br>182.7          |              |                    | 233.3<br>234.2 |       |
| 34             | 29.2         | 17.5         | 94               | 80.6           | 48.3         | 154        | 132.179.5                |            | 183.6                   |              |                    | 235.0          |       |
| 35             | 30.0         | 18.0         | 95               | 81.5           | 48.8         | 155        | 132.979.7                | 215        | 184.4                   |              | 275                | 235.9          |       |
| 36<br>37       | 30.9         | 18.5         | 96               | 82.5           | 49.4         | 156        | 133.8 80.2               |            | 185.3                   |              |                    | 236.7          |       |
| 38             | 31.7<br>32.6 | 19.0<br>19.5 | 97<br>98         | 83.2<br>84.1   | 49.9         | 157        | 134.7 80.7               |            | 186.1                   |              | 277                | 237.6<br>238.4 |       |
| 39             | 33.5         | 20.1         | 99               | 84.9           | 50.4<br>50.9 | 158<br>159 | 135.581.2<br>136.481.7   |            | 187.0<br>187.8          |              | 278<br>279         | 239.3          |       |
| 40             | 34.3         |              | 100              | 85.8           | 51.4         | 160        | 137.282.3                |            | 188.7                   |              | 280                | 240.2          |       |
| 41             | 35 2         | 21.1         | 101              |                |              |            |                          |            | \                       |              |                    |                |       |
| 42             | 36,0         | 21.6         | 101              | 86.6<br>87.5   | 51.9<br>52.4 | 161<br>162 | 138.182.8<br>139.083.3   | 221<br>222 | 189.6<br>190.4          |              | 281<br>282         | 241.0<br>241.9 |       |
| 48             | 36.9         | 22.1         | 103              | 88.3           | 53.0         | 163        | 139.883.8                |            | 191.3                   |              | 282                | 242.7          |       |
| 44             | 87.7         | 22.6         | 104              | 89.2           | 53.5         | 164        | 140.784.9                | 224        | 192.1                   |              | 284                | 243.6          |       |
| 45             | 38.6         | 23,1         | 105              | 90.1           | 54.0         | 165        | 141.5 84.8               |            | 193.0                   |              | 285                | 244.5          | 146.5 |
| 46             | 39.5<br>4).5 | 23.6<br>24.2 | •                | 90.9           | 54.5         | 166        | 142.485.3                | 226        | 193.8                   |              | 286                | 245.3          |       |
| 48             | 41.2         | 24.7         | 107              | 91.8<br>92.6   | 55.0<br>55.5 | 167<br>168 | 143.285.9<br>144.186.4   | 227<br>228 | 194.7<br>1 <b>9</b> 5.6 |              | 287<br>288         | 246.2<br>247.0 |       |
| 49             | 42.0         |              | 109              | 93.5           | 56.0         | 169        | 145.086.9                | 1          | 196.4                   |              | 289                | 247.9          |       |
| 50             | 42.9         | 25.7         | 110              | 94.4           | 56.6         | 170        | 145.8 87.4               | 230        | 197.3                   |              |                    | 248.7          |       |
| 51             | 43.7         | 26.2         | 111              | 95.2           | 57.1         | 171        | 146.787.9                | 231        | 198.1                   | 118 0        | 291                | 249.6          | 140 E |
| 52             | 44.6         |              | 112              | 96.1           | 57.6         |            | 147.5 88.4               |            | 199.0                   | 119.8        |                    | 250.5          |       |
| 53             | 45.5         | 27.2         | 113              | 96.9           |              |            | 148.488.9                | 233        | 199.9                   |              |                    | 251.3          |       |
| 54             | 46.3         | 27.8         | 114              | 97.6           | 58.6         | 174        | 149.2 89.5<br>150.1 90.0 | 234        | 200.7                   | 120.5        |                    | 252.2          | 151.1 |
| 55<br>56       | 47.2         |              |                  | 98.6           | 59.1         | 175        |                          | 285        | 201.6                   |              | 295                | 253.0          |       |
| <i>5</i> 7     | 48.0<br>48.9 | - 1          |                  | 99.5           | 59.6<br>60.2 |            | 151.0 90.5               | 236        | 202.4                   |              |                    | 253.9          |       |
| 58             | 49.7         |              |                  | 100.4<br>101.2 |              | 177<br>178 | 151.8 91.0<br>152.7 91.5 | 237<br>238 | 203.8<br>204.1          |              | 297<br>298         | 254.7<br>255.6 |       |
| 59             | 50.6         |              |                  | 102.1          | 61.2         |            | 153.5 92.0               | 239        | 205.0                   |              | 299                | 256.5          |       |
| 60             | 51.5         |              |                  | 102.9          |              |            | 154.492.5                | 240        | 205.9                   |              |                    | 257.3          |       |
| Dist.          | Den          | D.J 20       | Diet             | Den            | D.i.at       | Diet       | Dep. Dist                | Dier       | Den                     | D.I as       | Diet               |                |       |
| -              |              |              |                  |                |              |            |                          |            | _                       |              |                    |                | al    |
| l<br>- verball | NI           | ΔE.₄E.       |                  | E6E#E          | ·•           | 5Wb        | W¼W.                     | 74 M.P     | W <u></u> ₩,            |              | οr <b>3</b> ‡      | Points.        |       |

TABLE XII.
TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

| <u>-</u> - |              | NE6N         |               | SE.            |      |            | WbS.           | D QU         | NW          |                |                        | 3 Pc       |                |                    |
|------------|--------------|--------------|---------------|----------------|------|------------|----------------|--------------|-------------|----------------|------------------------|------------|----------------|--------------------|
| Dist       | D.Lat        |              |               | D. Lat         |      |            |                | Dep.         |             |                | Dep.                   |            | D.Lat          | Dep.               |
|            |              |              | ! <del></del> | ļ              |      | JI         | <b></b>        | <u></u>      |             | <del> </del>   |                        | l          | -              | <u> </u>           |
| 1 2        | 0.8          | 0.6<br>1.1   | 61<br>62      | 50.7<br>51.6   |      | 121<br>122 | 100.6          |              | 181<br>182  |                | 100 <i>.5</i><br>101.1 | 241<br>242 | 200.4          | 133.9              |
| 3          | 2.5          | 1.7          | 63            | 52.4           |      |            | 102.9          |              | 183         |                | 101.7                  | 243        |                | 135.0              |
| 4          | 3.3          |              | 64            | 53.2           |      |            | 103.1          |              | 184         |                | 102.2                  |            |                | 135.5              |
| 5          | 4.2          |              | 65            | 54.0           |      | 125        | 103.9          | 1            |             |                | 102.8                  |            | 208.7          | 186.1              |
| 6          | 5.0          | 3.3          | 66            | 54.9           |      |            | 104.8          | 70.0         | 186         |                | 103.3                  |            |                | 136.7              |
| 7          | 5.8          | 3.9          | 67            | 55.7           |      |            | 105.6          |              | 187         |                | 103.9                  |            |                | 137.2              |
| 8          | 6.7          | 4.4          | 68            | 56.5           |      |            | 106.4          |              | 188         |                | 104.4                  |            |                | 137.8              |
| 9          | 7.5          | 5.0          | 69            | 57.4           |      |            | 107.9          |              | 189         |                | 105.0                  |            |                | 138.9              |
| 10         | 8.3          | 5.6          | 70            | 58.2           | 38.9 | 130        | 108.1          | 72.2         | 190         | 136.0          | 105.5                  | 250        | 207.5          | 130.5              |
| 11         | 9.1          | 6.1          | 71            | 59.0           | 39.4 | 131        | 108.9          | 72.8         | 191         |                | 106.1                  | 251        |                | 139.4              |
| 12         | 10.0         | 6.7          | 72            | 59.9           |      |            | 109.8          |              | 192         |                | 106.7                  | 252        |                | 140.0              |
| 13         | 10.8         | 7.2          | 73            | 60.7           |      |            | 110.6          |              | 193         |                | 107.2                  | 253        |                | 140.5              |
| 14<br>15   | 11.6<br>12.5 | 7.8<br>8.3   | 74<br>75      | 61.5<br>62.4   |      | 134        | 111.4          |              | 194<br>195  |                | 107.8<br>108.5         | 254<br>255 |                | 2 141.1<br>2 141.7 |
| 16         | 13.3         | 8.9          | 76            | 63.2           |      |            | 113.1          |              | 196         |                | 108.9                  | 256        |                | 142.2              |
| 17         | 14.1         | 9.4          | 77            | 64.0           |      |            | 113.9          |              | 197         |                | 109.4                  |            |                | 142.8              |
| 18         | 15.0         | 10.0         | 78            | 64.9           |      |            | 114.7          |              | 198         |                | 110.0                  |            |                | 143.9              |
| 19         | 15.8         | 10.6         | 79            | 65.7           |      |            | 115.6          |              | 199         |                | 110.5                  |            | 215.4          | 143.9              |
| 20         | 16.6         | 11.1         | 80            | 66.5           | 44.4 | 140        | 116.4          |              | 200         | 166.3          | 111.1                  | 260        | 216.5          | 144.4              |
| 21         | 17.5         | 11.7         | 81            | 67.3           | 45 0 | 141        | 117.2          | 78.3         | 201         | 167.1          | 111.7                  | 261        | 217.0          | 145.0              |
| 22         | 18.3         |              | 82            | 68.2           |      |            | 118.1          |              | 202         |                | 112.2                  | 262        | 217.8          |                    |
| 23         | 19.1         | 12.8         | 83            | 69.0           |      | 143        | 118.9          |              | 203         |                | 112.8                  | 263        | 218.7          |                    |
| 24         | 20.0         |              | 84            | 69.8           |      | 144        | 119.7          |              | 204         |                | 113.3                  | 264        | 219.5          | 146.7              |
| 25         | 20.8         | 18.9         | 85            | 70.7           |      |            | 120.6          |              | 205         |                | 113.9                  | 265        | 220.5          |                    |
| 26<br>27   | 21.6         | 14.4         | 86            | 71.5           |      |            | 121.4          |              | 206         |                | 114.4                  |            | 221.2          |                    |
| 28         | 22.4         | 15.0<br>15.6 | 87            | 72.3           |      | 147        | 122.2<br>123.1 | 1 1          | 207<br>208  |                | 115.0<br>115.5         | 267<br>268 | 222.0<br>222.8 |                    |
| 29         | 24.1         | 16.1         | 89            | 74.0           |      |            | 123.1          |              | 209         |                | 116.1                  | 269        | 223.7          |                    |
| 50         | 24.9         | 16.7         | 90            | 74.8           |      |            | 124.7          |              | 210         |                | 116.7                  | 270        | 224.5          |                    |
|            | 95 9         |              |               |                |      |            | !              | .'           | <del></del> | '              | <del> </del>           | <u>'</u>   |                |                    |
| 31<br>32   | 25.8<br>26.6 | 17.2<br>17.8 | 91            | 75.7<br>76.5   |      | 151<br>152 | 125.6<br>126.4 |              | 211         |                | 117.2<br>117.8         | 271<br>272 | 225.5<br>226.2 |                    |
| 53         | 27.4         |              | 93            | 77.3           |      |            | 127.2          |              | 213         |                | 118.3                  | 273        | 227.0          |                    |
| 34         | 28.3         | 18.9         |               | 78.2           |      | 154        | 128.0          |              | 214         |                | 118.9                  | 274        | 227.8          |                    |
| 35         | 29.1         | 19.4         | 95            | 79.0           |      | 155        | 128.9          |              |             |                | 119.4                  | 275        | 228.7          |                    |
| 36         | 29.9         | 20.0         | 96            | 79.8           |      | 156        | 129.7          |              | 216         |                | 120.0                  | 276        | 229.5          |                    |
| 37         | 30.8         | 20.6         | 97            | 80.7           |      |            | 130.5          |              |             |                | 120.5                  | 277        | 250.9          | 153.9              |
| 38         | 31.6<br>32.4 | 21.1 $21.7$  | 98            | 81.5<br>82.3   |      | 158        | 181.4<br>132.2 |              |             |                | 121.1                  | 278        | 231.1          |                    |
| 40         | 33.5         | 22.2         | 100           | 83.1           |      | 159<br>160 | 133.2          |              | 219<br>220  |                | 121.7<br>122.2         | 279        | 232.0<br>232.8 |                    |
| 1          | <del> </del> |              |               | <u>}</u>       |      |            | ·              | <u>'</u> ——  |             | <u> </u>       |                        |            |                |                    |
| 41         | 34.1         | 22.8         | 101           | 84.0           |      |            | 138.9          |              | 221         |                | 122.8                  | 281        | 233.6          |                    |
| 42<br>43   | 34.9<br>35.8 | 23.3<br>23.9 | 102           | 84.8           |      | 162        | 134.7          | 90.0         | 222         |                | 123.9                  | 282        | 234.5          |                    |
| 44         | 36.6         | 24.4         | 103<br>104    | 85.6<br>86.5   |      | 163<br>164 | 135.5<br>136.4 |              | 223<br>224  |                | 123.9<br>124.4         | 283<br>284 | 235.3<br>236.1 |                    |
| 45         | 37.4         | 25.0         | 105           | 87.3           |      | 165        | 137.2          |              | 225         |                | 125.0                  | 285        | 237.0          |                    |
| 46         | 38.2         | 25.6         | 106           | 88.1           |      | 166        | 138.0          | 92.2         | 226         |                | 125.5                  | 286        | 237.8          | 158.9              |
| 47         | 39.1         | 26.1         | 107           | 89.0           |      |            | 138.9          | 92.8         | 227         | 188.7          | 126,1                  | 287        | 238.6          | 159.4              |
| 48         | 39.9         | 26.7         | 108           | 89.8           |      |            | 139.7          | 93.3         | 228         |                | 126.7                  | 288        | 239.5          |                    |
| 49<br>50   | 40.7         | 27.2<br>27.8 | 109           | 90.6           | 1    |            | 140.5          | 93.9         |             |                | 127.2                  | 289        | 240.3          |                    |
|            | '·           |              | 110           | 91.5           |      |            | 141.3          | 94.4         | '           |                | 127.8                  | 290        | 241.1          |                    |
| 51         | 42.4         |              | 111           | 92.3           |      |            | 142.2          |              |             |                | 128.3                  | 291        | 242.0          | 161.7              |
| 52         | 43.2         |              |               |                |      |            | 143.0          |              |             |                | 128.9                  | 292        | 242.8          | 162.2              |
| 53<br>54   | 44.1         | 29.4<br>30.0 | 113           | 94.0           |      |            | 143.8          |              |             |                | 129.4                  |            | 243.6          |                    |
| 55         | 45.7         | 30.6         | 114           | 94.8 6<br>95.6 |      |            | 144.7<br>145.5 | 96.7<br>97.2 |             | 194.6<br>195.4 |                        |            | 244.5<br>245.3 |                    |
| 56         | 46.6         | 31.1         | 116           | 96.5           |      |            | 146.3          |              |             |                | 131.1                  | 295<br>296 | 246.1          | 164.               |
| 57         | 47.4         | 31.7         | 117           | 97.3           |      |            | 147.2          |              |             | 197.1          |                        |            | 246.9          |                    |
| 58         | 48.2         | 32.2         | 118           | 98.1           |      |            | 148.0          |              |             |                | 132.2                  | 298        | 247.8          |                    |
| 59         | 49.1         |              | 119           | 98.9           |      |            | 148.8          | 99.4         | 239         | 198.7          | 132.8                  | 299        | 248.6          | 166.1              |
| 60         | 49.9         | 33.3         | 120           | 99.8           | 66.7 | 180        | 149.7          | 100.0        | 240         | 199.6          | 133.5                  | 300        | 249,4          | 166.7              |
| Dist.      | Dep. 1       | D.Lat        | Dist.         | Dep. I         | Lat  | Dist.      | Dep.           | D. Lat       | Dist.       | Den.           | D. Lat                 | Dist.      | Dep.           | D. Lat             |
|            |              | NE&E.        |               |                |      |            |                | 11           |             |                |                        |            |                |                    |
|            |              |              |               | SE&E.          |      | ۷۵         | V&W.           |              | NW          | w,             | 0                      | 5 Pc       | ints.          |                    |

#### TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

|          |              | NEIN         |            | SEAS.                  |            | SW 3S. |              | NW         | ₹N,            |                | or 34 1    | Points.        |       |
|----------|--------------|--------------|------------|------------------------|------------|--------|--------------|------------|----------------|----------------|------------|----------------|-------|
| Dist.    | D.Lat        |              |            | D. Lat Dep.            |            | D. Lat | Dep.         |            |                |                |            | D.Lat          | Dep.  |
|          |              |              | 61         | 49.036.3               | <u> </u>   | 97.2   | 72.1         | 181        | 145.4          |                | 241        | 193.6          |       |
| 1 2      | 0.8          | 0.6          | 62         | 49.836.9               | 121        | 98.0   | 72.7         | 182        | 146.2          |                | 242        | 194.4          |       |
| 3        | 2.4          | 1.8          | 63         | 50.637.5               | 123        | 98.8   | 73.3         | 183        |                | 109.0          |            | 195.2          |       |
| 4        | 3.2          | 2.4          | 64         | 51.438.1               | 124        | 99.6   | 73.9         |            | 147.8          |                |            | 196.0          |       |
| 5        | 4.0          | 3.0          | 65         | 52.2 38.7              |            | 100.4  | 74.5         |            | 148.6          |                |            | 196.8          |       |
| 6        | 4.8          | 3.6          | 66         | 53.0 39.3              | 126        | 101.2  | 75.1         | 186        | 149.4          |                | 246        | 197.6          | 146.5 |
| 7        | 5.6          | 4.2          | 67         | 53.8 39.9              |            | 102.0  | 75.7         |            | 150.2          |                | 247        | 198.4          |       |
| 8        | 6.4          | 4.8          | 68         | 54.6 40.5              |            | 102.8  | 76.2         |            | 151.0          |                |            | 199.2          |       |
| 9        | 7.2          | 5.4          | 69         | 55.441.1               | 129        | 103.6  | 76.8         |            | 151.8          |                | 249        | 200.0          |       |
| 10       | 8.0          | 6.0          | 70         | 56.2 41.7              | 130        | 104.4  | 77.4         | 190        | 132.6          | 113.2          | 250        | 200.8          | 148.9 |
| 11       | 8.8          | 6.6          | 71         | 57.0 42.3              | 131        | 105.2  | 78.0         | 191        | 153.4          | 113.8          | 251        | 201.6          | 149.5 |
| 12       | 9.6          | 7.1          | 72         | 57.8 42.9              | 132        | 106.0  | 78.6         | 192        | 154.2          | 114.4          | 252        | 202.4          |       |
| 13       | 10.4         | 7.7          | 73         | 58.6 43.5              | 133        | 106.8  | 79.2         |            | 155.0          |                | 253        | 203.2          |       |
| 14       | 11.2         | 8.3          | 74         | 59.4 44.1              | 134        | 107.6  | 79.8         |            | 155.8          |                | 254        | 204.0          |       |
| 15       | 12.0         | 8.9          | 75         | 60.2 44.7              | 135        | 103.4  | 80.4         |            | 156.6          |                | 255        | 204.8          |       |
| 16       | 12.9         | 9.5          | 76         | 61.0 45.3              |            | 109.2  | 81.0         |            | 157.4          |                | 256        | 205.6<br>206.4 |       |
| 17       | 13.7         | 10.1         | 77         | 61.8 45.9              | 137        | 110.0  | 81.6         |            | 158.2<br>159.0 |                | 257<br>258 | 207.2          |       |
| 18       | 14.5         | 10.7         | 78         | 62.7 46.5              | 138        | 110.8  | 82.2<br>82.8 |            | 159.8          |                | 259        | 208.0          |       |
| 19<br>20 | 15.3<br>16.1 | 11.3<br>11.9 | 79<br>80   | 63.5 47.1 64.3 47.7    | 139<br>140 | 111.6  | 83.4         |            | 160.6          |                | 260        | 208.8          |       |
|          |              |              |            |                        | ļ          | \      |              | <u> </u>   | <u></u>        |                | <u> </u>   |                |       |
| 21       | 16.9         | 12.5         | 81         | 65.1 48.3              | 141        | 113.3  | 84.0         | 201        |                | 119.7          | 261        | 209.6          |       |
| 22       | 17.7         | 13.1         | 82         | 65.9 48.8              | 142        | 114.1  | 84.6         |            | 162.2          |                | 262        | 210.4          |       |
| 23       | 18.5         | 13.7         | 83         | 66.7 49.4              | 143        | 114.9  | 85.2         |            | 163.1          |                | 263        | 211.2          |       |
| 24       | 19.3         |              | 84         | 67.550.0               |            | 115.7  | 85.8         |            | 164.7          | 121.5          | 264<br>265 | 212.0<br>212.8 |       |
| 25       | 20.1         | 14.9         | 85         | 68.3 50.6              | 145        | 116.5  | 86.4<br>87.0 | 206        |                | 122.7          | 266        | 213.7          |       |
| 26<br>27 | 20.9<br>21.7 | 15.5<br>16.1 | 86<br>87   | 69.151.2<br>69.951.8   | 146<br>147 | 117.3  | 87.6         | 207        |                | 123.3          | 267        | 214.5          |       |
| 28       | 22.5         | 16.7         | 88         | 70.7 52.4              |            | 118.9  | 88.2         | 208        |                | 123.9          | 268        | 215.3          |       |
| 29       | 23.3         | 17.3         | 89         | 71.5 53.0              |            | 119.7  | 88.8         | 209        |                | 124.5          |            | 216.1          |       |
| 30       | 24.1         | 17.9         |            | 72.353.6               |            | 120.5  | 89.4         | 210        | 168.7          | 125.1          | 270        | 216.9          | 160.8 |
|          | 94.0         |              |            | !                      |            | 101 6  |              | 211        | 160 5          | 125.7          | 271        | 217.7          | 161 4 |
| 31<br>32 | 24.9<br>25.7 | 18.5<br>19.1 | 91<br>92   | 73.154.2<br>73.954.8   | 151<br>152 | 121.3  | 90.0<br>90.5 | 212        |                | 126.3          |            | 218.5          |       |
| 33       | 26.5         | 19.7         | 93         | 74.755.4               | 153        | 122.9  |              | 213        | 1              | 126.9          |            | 219.3          |       |
| 34       | 27.3         | 20.3         | 94         | 75.556.0               | 154        | 123.7  | 91.7         |            | 171.9          |                | 274        | 220.1          |       |
| 35       | 28.1         | 20.8         | 95         | 76.356.6               | 155        | 124.5  | 92.3         |            | 172.7          |                | 275        | 220.9          | 163.8 |
| 36       | 28.9         | 21.4         | 96         | 77.1 57.2              | 156        | 125.3  | 92.9         |            | 173.5          |                | 276        | 221.7          |       |
| 37       | 29.7         | 22.0         | 97         | 77.9 57.8              | 157        | 126.1  | 93.5         |            |                | 129.3          |            | 222.5          |       |
| 38       | 30.5         | 22.6         | 98         | 78.7 58.4              |            | 126.9  | 94.1         |            | 175.1          |                | 278        | 223.3          |       |
| 39       | 31.3         | 23.2         | 99         | 79.559.0               | 159        | 127.7  | 94.7         |            |                | 130.5          |            | 224.1<br>224.9 |       |
| 40       | 32.1         | 23.8         | 100        | 80.3 59.6              | 160        | 128.5  | 95.8         | 220        | 176.7          | 131.1          | 280        | 224.9          | 100.6 |
| 41       | 32.9         | 24.4         | 101        | 81.160.2               | 161        | 129.3  | 95.9         | 221        | 177.5          | 131.6          | 281        | 225.7          | 167.4 |
| 42       | 33.7         | 25.0         | 102        | 81.960.8               | 162        | 130.1  | 96.5         | 222        |                | 132.2          | 282        | 226.5          |       |
| 48       | 34.5         | 25.6         | 103        | 82.7 61.4              | 163        | 130.9  |              | 223        |                | 132.8          | 283        | 227.3          |       |
| 44       | 35.3         | 26.2         | 104        | 83.5 62.0              | 164        | 131.7  | 97.7         | 224        |                | 133.4          | 284        | 228.1          |       |
| 45       | 36.1         | 26.8         | 105        | 84.5 62.5              | 165        | 132.5  | 98.3         | 225        |                | 134.0          |            | 228.9          |       |
| 46       | 36.9         | 27.4         | 106        | 85.163.1               | 166        | 133.3  | 98.9<br>99.5 | 226<br>227 |                | 134.6<br>135.2 | 286<br>287 | 229.7<br>230.5 |       |
| 47<br>48 | 37.8<br>38.6 | 28.0<br>28.6 | 107<br>108 | 85.9 63.7<br>86.7 64.3 | 167<br>168 | 134.1  | 100.1        | 228        |                | 135.2          | 288        | 231.3          |       |
| 49       | 39.4         | 29.2         | 109        | 87.564.9               | 169        |        | 100.7        | 229        |                | 136.4          | 289        | 232.1          |       |
| 50       | 40.2         | 29.8         | 110        | 88.465.5               | 170        |        | 101.3        |            | 184.7          |                | 290        | 232.9          |       |
|          |              |              |            |                        |            |        |              |            |                |                |            | 233.7          | 179 0 |
| 51<br>52 | 41.0         | 30.4         | 111        | 89.2 66.1<br>90.0 66.7 | 171        | 137.3  |              | 231        | 186.3          | 137.6          | 291<br>292 | 233.7          |       |
| 53       |              |              |            | 90.066.7               |            | 139.0  |              |            | 187.1          |                |            | 235.3          |       |
| 51       | 43.4         | 31.6<br>32.2 | 114        | 91.667.9               | 174        |        | 103.1        |            | 188.0          |                |            | 236.1          |       |
| 55       | 44.2         | 32.8         | 115        | 92.4 68.5              | 175        |        | 104.2        | 235        |                | 140.0          |            | 236.9          |       |
| 56       | 45.0         | 33.4         | 116        | 93.2 69.1              | 176        |        | 104.8        |            |                | 140.6          |            | 237.7          |       |
| 57       | 45.8         |              |            | 94.0 69.7              | 177        |        | 105.4        | 237        |                | 141.2          | 297        | 238.6          | 176.9 |
| 58       | 46.6         |              |            | 94.8 70.3              | 178        | 143.0  |              | 238        | 191.2          | 141.8          | 298        | 239.4          |       |
| 59       | 47.4         | 35.2         | 119        | 95.6 70.9              | 179        | 143.8  | 106.6        | 239        |                | 142.4          | 299        | 240.2          | 178.1 |
| 60       | 48.2         | 35.7         | 120        | 96.471.5               | 180        | 144.6  | 107.2        | 240        | 192.8          | 143.0          | 300        | 241.0          | 178.7 |
| Dist     | Den          | D. L.at      | Dist       | Dep. D.lat             | Dist       | Den.   | D.I at       | Dist.      | Dep.           | D. Lat         | Dist.      | Dep.           | D.Lat |
|          | , -cp. (     |              |            | · Dep. Waat            | . 2 100.   |        | , at         | . ~ 1000   | , - vp.        |                |            |                |       |

TABLE XII.

TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

NE<sub>4</sub>N. SE<sub>4</sub>S. SW<sub>4</sub>S. NW<sub>4</sub>N, or S<sub>4</sub> Points.

|            |              | NEĮN.               | •          | SE              | S.             | S          | W <sub>2</sub> S. |                | NW         | N,             | or                     | SĮ P       | oints.         |                |
|------------|--------------|---------------------|------------|-----------------|----------------|------------|-------------------|----------------|------------|----------------|------------------------|------------|----------------|----------------|
| Dist       | DLat         | Dep.                | Dist.      | D.Lat           | Dep.           | Dist.      | D.Lat             | Dep.           | Dist.      | D.Lat          | Dep.                   | Dist.      | D.Lat          | Dep.           |
| 1          | 0.8          | 0.6                 | 61         | 47.2            | 38.7           | 121        | 93.5              | 76.8           | 181        | 139.9          | 114.8                  | 241        | 186.3          | 152.9          |
| 2          | 1.5          | 1.3                 | 62         | 47.9            |                | 122        | 94.3              | 77.4           | 182        | 140.7          |                        | 242        | 187.1          |                |
| 3          | 2.3          | 1.9                 |            | 48.7            |                | 123        | 95.1              | 78.0           | 183        | 141.5          |                        | 243        | 187.8          |                |
| 4          | 3.1          | 2.5                 |            |                 | 40.6           | 124        | 95.9              | 78.7           | 184        | 142.2          |                        | 244        | 188.6<br>189.4 |                |
| 5          | 3.9<br>4.6   | 3.2<br>3.8          | 65<br>66   | 50.2            | 41.2           | 125<br>126 | 96.6<br>97.4      | 79.3<br>79.9   | 185<br>186 | 143.0<br>143.8 |                        | 245<br>246 | 190.2          |                |
| 6<br>7     | 5.4          | 4.4                 | 67         | 51.8            |                | 127        | 98.2              | 80.6           | 187        |                | 118.6                  | 247        | 190.9          |                |
| 8          | 6.2          | 5.1                 | <b>6</b> 8 | 52.6            |                | 128        | 98.9              | 81.2           | 188        |                | 119.3                  | 248        | 191.7          |                |
| 9          | 7.C          | 5.7                 | 69         |                 | 43.8           | 129        | 99.7              | 81.8           | 189 .      | 146.1          |                        | 249        | 192.5          |                |
| 10         | 7.7          | 6.3                 | 70         | 54.1            | 44.4           | 130        | 100.5             | 82.5           | 190        | 146.9          | 120.5                  | 250        | 198.8          | 158.6          |
| 11         | 8.5          | 7.0                 | 71         |                 | 45.0           | 131        | 101.3             | 83.1           | 191        |                | 121.2                  | 251        | 194.0          |                |
| 12         | 9.3          | 7.6                 | 72<br>73   |                 | 45.7           | 132        | 102.0             | 83.7           | 192        |                | 121.8                  | 252<br>253 | 194.8<br>195.6 |                |
| 13<br>14   | 10.0         | $8.2 \\ 8.9$        | 74         |                 | 46.3<br>46.9   | 133<br>134 | 102.8<br>103.6    | 84.4<br>85.0   | 193<br>194 | 150.0          | 122.4                  | 254        | 196.9          |                |
| 15         | 11.6         | 9.5                 | 75         |                 | 47.6           | 135        | 104.4             | 85.6           |            |                | 123.7                  | 255        | 197.1          |                |
| 16         | 12.4         | 10.2                | 76         |                 | 48.2           | 136        | 105.1             | 86.3           | 196        |                | 124.3                  | 256        | 197.9          |                |
| 17         | 13.1         | 10.8                |            |                 | 48.8           | 137        | 105.9             | 86.9           |            | 152.3          | 125.0                  | 257        | 198.7          |                |
| 18         | 13.9         | 11.4                | 78         |                 | 49.5           | 138        | 106.7             | 87.5           |            |                | 125.6                  | 258        |                | 163.7          |
| 19         | 14.7         | 12.1<br>12.7        | 79<br>80   |                 | 50.1<br>50.8   | 139        | 107.4             | 88.2           | 199<br>200 |                | 126.2                  | 259<br>260 | 200.2          |                |
| 20         | 15.5         | '                   | !          | !               | <u>  </u>      | 140        | 108.2             | 88.8           | !          | ļ              | 126.9                  |            |                | 164.9          |
| 21         | 16.2         | 13.3                |            |                 | 51.4<br>52.0   | 141        | 109.0             |                | 201        |                | 127.5                  | 261<br>262 |                | 165.6<br>166.9 |
| 22<br>23   | 17.0<br>17.8 | 14.6                | 83         |                 | 52.7           | 142        | 109.8<br>110.5    | 90.1<br>90.7   | 202<br>203 |                | 128.1<br>128.8         | 263        |                | 166.8          |
| 24         | 18.6         | 15.2                | 84         |                 | 53.3           | 144        | 111.3             |                | 204        |                | 129.4                  | 264        |                | 167.5          |
| 25         | 19.3         | 15.9                | 85         | 65.7            | 53.9           | 145        | 112.1             | 92.0           | 205        |                | 130.1                  | 265        | 204.8          | 168.1          |
| 26         | 20.1         | 16.5                | 86         |                 | 54.6           | 146        | 112.9             |                |            |                | 130.7                  | 266        | 205.6          |                |
| 27         | 20.9         | 17.1                | 87         |                 | 55.2           | 147        | 113.6             | 93.3           | 207        |                | 191.8                  | 267        | 206.4          |                |
| 28         | 21.6         | 17.8<br>18.4        | 88<br>89   |                 | 55.8<br>56.5   | 148        | 114.4             | 93.9<br>94.5   | 208<br>209 |                | 182.0<br>182.6         | 268<br>269 |                | 170.0          |
| 29<br>30   | 22.4<br>23.2 | 19.0                | 90         |                 | 57.1           | 150        | 115.2<br>116.0    |                | 210        |                | 133.2                  | 270        |                | 171.5          |
|            | 24.0         | 19.7                | 91         |                 | 57.7           | 151        | 116.7             | 95.8           | 211        |                | 133.9                  | 271        | <del> </del>   | 171.9          |
| 31<br>32   | 24.7         | 20.3                | 92         |                 | 58.4           | 152        | 117.5             |                | 212        |                | 134.5                  |            | 210.3          |                |
| 33         | 25.5         | 20.9                | 93         |                 | 59.0           |            | 118.3             |                | 213        |                | 135.1                  | 273        | 211.0          |                |
| 34         | 26.3         | 21.6                | 94         |                 | 59.6           |            | 119.0             | 97.7           | 214        |                | 185.8                  | 274        | 211.8          |                |
| 35         | 27.1         | 22.2                | 95         |                 | 60.3           |            | 119.8             |                | 215        |                | 186.4                  |            |                | 174.5          |
| 36         | 27.8         | 22.8<br>23.5        | 96<br>97   |                 | 60.9           |            | 120.6             |                |            |                | 137.0                  | 276        | 213.4          |                |
| 37<br>38   | 28.6<br>29.4 | 24.1                | 98         |                 | $61.5 \\ 62.2$ | 157<br>158 | 121.4             | 99.6<br>100.2  | 217<br>218 |                | 137.7<br>138.3         | 277<br>278 | 214.1          | 175.7          |
| 39         | 30.1         | 24.7                | 99         |                 | 62.8           | 159        |                   | 100.9          |            |                | 138.9                  | 279        |                | 177.0          |
| 40         | 30.9         | 25.4                | 100        |                 | 63.4           |            |                   | 101.5          | 220        |                | 139.6                  | 280        |                | 177.6          |
| 41         | 31.7         | 26.0                | 101        | 78.1            | 64.1           | 161        | 124.5             | 102.1          | 221        | 170.8          | 140.2                  | 281        | 217.9          | 178.5          |
| 42         | 32.5         | 26.6                | 102        | 78.8            | 64.7           | 162        | 125.2             | 102.8          | 222        | 171.6          | 140.8                  | 282        | 218.0          | 178 9          |
| 43         | 33.2         | 27.3                | 103        |                 | 65.3           |            |                   | 103.4          |            |                | 141.5                  | 283        | 218.8          |                |
| 44         | 94.0         | 27.9                | 104        |                 | 66.0           | 164        |                   | 104.0          | 224        |                | 142.1<br>142.7         | 284        |                | 180.8          |
| 45<br>46   | 34.8<br>35.6 | $\frac{28.5}{29.2}$ | 105<br>106 |                 | 66.6<br>67.2   | 165<br>166 |                   | 104.7<br>105.3 | 225<br>226 |                | 142.7                  | 285<br>286 |                | 181.4          |
| 47         | 36.3         | 29.8                | 107        |                 | 67.9           | 167        |                   | 105.9          | 227        |                | 144.0                  |            |                | 182.           |
| 48         | 37.1         | 80.5                | 108        |                 | 68.5           | 168        |                   | 106.6          | 228        |                | 144.6                  | 288        | 222.6          | 182.7          |
| 49         | 37.9         | 31.1                | 109        |                 | 69.1           | 169        |                   | 107.2          |            |                | 145.3                  |            |                | 183.5          |
| 50         | 38.7         | 31.7                | 110        | 85.0            | 69.8           | 170        | 131.4             | 107.8          | 230        |                | 145.9                  | 290        | · i            | 184.0          |
| 51         | 39.4         | 32.4                | 111        |                 | 70.4           |            |                   | 108.5          | 231        |                | 146.5                  |            | 224.9          | 184.6          |
| <b>5</b> 2 |              | 33.0                |            |                 | 71.1           |            |                   | 109.1          |            |                | 147.2                  |            | 225.7          |                |
| 53<br>54   | 41.0<br>41.7 | 33.6<br>34.3        | 113<br>114 |                 | $71.7 \\ 72.8$ | 173        |                   | 109.8<br>110.4 | 233<br>234 |                | 147.8<br>148.4         |            | 226.5<br>227.5 |                |
| <b>5</b> 5 | 42.5         |                     | 115        |                 | 73.0           |            |                   | 111.0          |            |                | 149.1                  |            | 228.0          |                |
| 56         |              | 35.5                | 116        |                 | 73.6           | 176        |                   | 111.7          | 236        |                | 149.7                  | 296        | 228.8          | 187.8          |
| 57         | 44.1         | 36.2                | 117        | 99.4            | 74.2           | 177        | 136.8             | 112.3          | 237        | 183.2          | 150.4                  | 297        | 229.6          | 188.4          |
| 58         | 44.8         | \$5.8               | 118        |                 | 74.9           | 178        |                   | 112.9          | 238        |                | 151.0                  |            |                | 189.C          |
| 59<br>60   | 45.6<br>46.4 | 37.4<br>38.1        | 119        |                 | $75.5 \\ 76.1$ | 179        |                   | 113.6<br>114.2 | 239<br>240 |                | 151.6<br>1 <b>52.8</b> | 299<br>300 |                | 189.7<br>190.3 |
|            |              |                     |            |                 | I              |            |                   |                |            |                |                        |            |                |                |
| )ist.      |              | D.Lat               | Dist.      |                 |                | Dist.      |                   | D.Lat          | Dist.      |                | DLat                   | Dist.      |                | D.Lat          |
|            |              | NE <u>₹</u> E.      |            | SE <sub>2</sub> | Ľ.             | S          | wyw.              |                | NW         | ₹W,            |                        | or 44      | Points         |                |

TABLE XII.
TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

| _        |              | MINI              | <del></del> | 07710              |            | CALLIC             |          | <b>\</b> | 137                  |     |            |                |       |
|----------|--------------|-------------------|-------------|--------------------|------------|--------------------|----------|----------|----------------------|-----|------------|----------------|-------|
| <u></u>  | 15.7         | NE <sub>4</sub> N |             | SE4S.              | 7=-        | SW <sub>4</sub> S. |          | _NW      |                      |     |            | Points.        |       |
| Dist.    | D.Lat        | Dep.              | Dist.       | D.Lat De           | p. Dist.   | D.Lat              | Dep.     | Dist.    | D.Lat D              | ep. | Dist.      | D.Lat          | Dep.  |
| 1        | 0.7          | 0.7               | 61          | 45.2 41            | 0 121      | 89.7               | 81.5     | 181      | 134.1 12             | 1 6 | 24.1       | 178.6          | 161 9 |
| 2        | 1.5          | 1.3               | 62          | 45.9 41            |            | 90.4               |          | 182      | 134.9 12             |     | 242        | 179.3          |       |
| 3        | 2.2          | 2.0               | 63          | 46.7 42            |            | 91.1               | 82.6     | 183      | 134.912              |     |            | 180.1          |       |
| 4        | 3.0          | 2.7               | 64          | 47.448             |            | 91.9               | 83.3     | 184      | 136.3 12             |     |            | 180.1          |       |
| 5        | 3.7          | 3.4               | 65          | 48.2 43            |            | 92.6               | 83.9     | 185      | 137.1 12             |     | 245        | 181.5          |       |
| 6        | 4.4          | 4.0               | 66          | 48.9 44            |            | 93.4               | 84.6     | 186      | 137.8 12             |     | 246        | 182.5          |       |
| 7        | 5.2          | 4.7               | 67          | 49.6 45            |            | 94.1               | 85.3     | 187      | 138 6 12             |     | 247        | 183.0          |       |
| 8        | 5.9          | 5.4               | 68          | 50.4 45            |            | 94.8               | 86.0     | 188      | 139.3 12             |     | 248        | 183.8          |       |
| 9        | 6.7          | 6.0               | 69          | 51.146             |            | 95.6               | 86.6     | 189      | 140.012              |     | 249        | 184.5          |       |
| 10       | 7.4          | 6.7               | 70          | 51.947             |            | 96.3               |          | 190      | 140.8 12             |     | 250        | 185.2          |       |
| <b> </b> |              | <u> </u>          |             |                    |            |                    | -07.5    | 130      | 110.0                |     | 250        | 100.2          | 101.3 |
| 1.11     | 8.2          | 7.4               | 71          | 52.6 47            |            | 97.1               | 88.0     | 191      | 141.5 12             | 8.3 | 251        | 186.0          | 168.6 |
| 12       | 8.9          | 8.1               | 72          | 53.3 48            |            | 97.8               | 88.6     | 192      | 142.3 12             | 8.9 | 252        | 186.7          | 169.2 |
| 13       | 9.6          | 8.7               | 73          | 54.149             | 11         | 98.5               | 89.3     | 193      | 148.0 12             |     | 253        | 187.5          | 169.9 |
| 14       | 10.4         | 9.4               | 74          | 54.8 49            |            | 99.3               | 90.0     | 194      | 143.7 13             |     | 254        | 188.2          | 170.6 |
| 15       | 11.1         | 10.1              | 75          | 55.6 50            |            | 100.0              | 90.7     | 195      | 144.5 13             | 1.0 | 255        | 188.9          | 171.2 |
| 16       | 11.9         | 10.7              | 76          | 56.3 51            |            | 100.8              | 91.3     | 196      | 145.2 13             | 1.6 | 256        | 189.7          | 171.9 |
| 17       | 12.6         | 11.4              | 77          | 57.1 51            |            | 101.5              |          | 197      | 146.0 13             |     | 257        | 190.4          | 172.6 |
| 18       | 13.3         | 12.1              | 78          | 57.8 52            |            | 102.3              | 92.7     | 198      | 146.7 13             |     | 258        | 191.2          |       |
| 19       | 14.1         | 12.8              | 79          | 58.5 53            |            | 103.0              |          | 199      | 147.4 13             |     | 259        | 191.9          |       |
| 20       | 14.8         | 13.4              | 80          | 59.3 53            | 7 140      | 103.7              | 94.0     | 200      | 148.2 13             | 4.3 | 260        | 192.6          | 174.6 |
| 21       | 15.6         | 14.1              | 81          | 60.0 54            | 4 141      | 104.5              | 94.7     | 201      | 148.9 13             | 5.0 | 961        | 109 4          | 175 0 |
| 22       | 16.8         | 14.8              | 82          | 60.8 55            |            | 105.2              | 95.4     | 201      | 149.7 13             |     | 261<br>262 | 193.4<br>194.1 |       |
| 23       | 17.0         | 15.4              | 83          | 61.555             |            | 106.0              | 96.0     | 203      | 150.4 13             |     | 263        | 194.9          |       |
| 24       | 17.8         | 16.1              | 84          | 62.2 56            |            | 106.7              | 96.7     | 204      | 151.2 19             |     | 264        | 195.6          |       |
| 25       | 18.5         | 16.8              | 85          | 63.0 57            |            | 107.4              |          | 205      | 151.9 13             |     | 265        | 196.4          |       |
| 26       | 19.3         | 17.5              | 86          | 63.7 57            |            | 108.2              | 98.0     | 206      | 152.6 19             |     | 266        | 197.1          |       |
| 27       | 20 0         |                   | 87          | 64.5 58            |            | 108.9              |          | 207      | 153.4 13             |     | 267        | 197.8          |       |
| 28       | 20.7         | 18.8              | 88          | 65.2 59            |            | 109.7              |          | 208      | 154.1 18             |     | 268        | 198.6          |       |
| 29       | 21.5         | 19.5              | 89          | 65.9 59            |            | 110.4              |          | 209      | 154.9 14             |     | 269        | 199.3          |       |
| 30       | 22.2         | 20.1              | 90          | 66.7 60            |            | 111.1              |          | 210      | 155.6 14             |     | 270        | 200.1          |       |
| -        |              |                   |             | ·                  | -          | _!                 | !        |          | <u> </u>             |     |            | <u></u>        |       |
| 31       | 23.0         | 20.8              | 91          | 67.461             |            |                    | 101.4    | 211      | 156.3 14             |     | 271        | 200.8          |       |
| 32       | 23.7         | 21.5              | 92          | 68.261             |            |                    | 102.1    | 212      | 157.1 14             |     | 272        | 201.5          |       |
| 33<br>34 | 24.5         | 22.2              | 93          | 68.962             |            |                    | 102.7    | 213      | 157.8 14             |     | 273        | 202.3          |       |
| 35       | 25.2         | 22.8              | 94          | 69.663             |            |                    | 103.4    | 214      | 158.6 14             |     | 274        | 203.0          |       |
| 36       | 25.9         | 23.5              | 95<br>96    | 70.4 63            |            | 114.8              |          | 215      | 159.3 14             |     | 275        | 203.8          |       |
| 37       | 26.7<br>27.4 | 24.2<br>24.8      | 97          | 71.164             |            |                    | 104.8    | 216      | 160.014              |     | 276        | 204.5          |       |
| 38       | 28.2         | 25.5              | 98          | 71.965             |            |                    | 105.4    | 217      | 160.8 14             |     | 277        | 205.2          |       |
| 89       | 28.9         | 26.2              | 99          | 72.6 65            |            | 117.1              |          | 218      | 161.5 14             |     | 278        | 206.0          |       |
| 40       | 29.6         |                   | 100         | 73.4 66            |            |                    | 106.8    | 219      | 162.3 14             |     | 279        | 206.7          |       |
|          | 23.0         | 26.9              | 100         | 74.1 67            | 2 160      | 118.6              | 107.4    | 220      | 163.0 14             | 1.1 | 280        | 207.5          | 100.0 |
| 41       | 30.4         | 27.5              | 101         | 74.8 67            | 8 161      | 119.3              | 108.1    | 221      | 163.8 14             | 8.4 | 281        | 208.2          | 188.7 |
| 42       | 31.1         | 28.2              | 102         | 75.6 68            |            |                    | 108.8    | 222      | 164.5 14             |     | 282        | 208.9          |       |
| 43       | 31.9         | 28.9              | 103         | 76.3 69            |            |                    | 109.5    | 223      | 165.2 14             |     | 283        | 209.7          |       |
| 44       | 32.6         | 29.5              | 104         | 77.1 69            |            | 121.5              |          | 224      | 166.0 15             |     | 284        | 210.4          |       |
| 45       | 33.3         | 30.2              | 105         | 77.8 70            |            | 122.3              |          | 225      | 166.7 15             |     | 285        | 211.2          |       |
| 46       | 34.1         | 30.9              | 106         | 78.5 71.           |            | 123.0              |          | 226      | 167.5 15             |     | 286        | 211.9          |       |
| 47       | 34.8         | 31.6              | 107         | 79.371             | 9 167      |                    | 112.2    | 227      | 168.2 15             |     | 287        | 212.7          |       |
| 48       | 35,6         | 32.2              | 108         | 80.072             |            |                    | 112.8    | 228      | 168.9 15             |     | 288        | 213.4          |       |
| 49       | 36.3         | 32.9              | 109         | 80.8 73            | 2 169      | 125.2              | 113.5    | 229      | 169.7 15             |     | 289        | 214.1          |       |
| 50       | 37.0         | 33.6              | 110         | 81.5 73            | 9 170      | 126.0              | 114.2    | 230      | 170.4 15             | 4.5 | 290        | 214.9          | 194.8 |
| 51       | 37.8         | 84.2              | 111         | 80 0174            | 6 171      | 126.7              | 116 6    | 003      | <del></del>          | (   | 901        | ·              |       |
| 52       | 38.5         |                   |             | 82.274             |            |                    |          | 231      | 171.2 15             |     | 291        | 215.6          |       |
| 58       | 39.3         |                   |             | 1 -0.0,.0          |            | 127.4              | 115.5    |          | 171.9 15             |     |            | 216.4          |       |
| 54       | 40.0         | 36.3              | 114         | 89:775             |            |                    | 110.2    |          | 172.6 15             |     |            | 217.1          |       |
| 55       | 40.8         | 36.9              | 115         | 84.5 76            |            | 128.9              |          | 234      | 178.4 15             |     | 294        | 217.8          |       |
| 56       | 41.5         | 37.6              |             | 85.277             |            | 129.7              |          | 235      | 174.115              |     | 295        | 218.6          |       |
| 57       | 42.2         | 38.3              | 117         | 86.0 77<br>86.7 78 |            | 130.4              |          | 236      | 174.9 15             |     | 296        | 219.3          |       |
| 58       | 43.0         | 39.0              | 118         | 87.4 79            |            | 131.1              |          | 297      | 175 6 15             |     | 297        | 220.1          |       |
| 59       | 43.7         | 39.6              |             | 88.279             |            |                    |          | 238      | 176.3 15             |     | 298<br>299 | 220.8          |       |
| 60       | 44.5         |                   |             | 88.980             |            | 132.6<br>135.4     |          | 240      | 177.1 16<br>177.8 16 |     |            | 221.5<br>222.8 |       |
|          |              |                   |             |                    | 11         | _'                 | l        |          | la. l                |     |            | 4i             |       |
| Dist.    | Dep.         | D.Lat             | Dist.       | ' Dep:  D.1        | at   Dist. | 'Dep.              | ID.Lat ( | Dist.    | Dep. D.              | Lat | Dist.      | Dep.           | D.Lat |
|          |              |                   |             |                    |            |                    | `        |          |                      |     | •          | •              |       |

TABLE XII.
TRAVERSE TABLE, TO POINTS AND QUARTERS OF THE COMPASS.

|          |              | N            | E.         | S            | E.             | S          | w.             | N            | īW,        |                | or 4 P | oints.     |                            |
|----------|--------------|--------------|------------|--------------|----------------|------------|----------------|--------------|------------|----------------|--------|------------|----------------------------|
| Dist.    | DLat         | Dep.         |            | D.Lat        |                |            | D.Lat          |              |            | D.Lat          |        |            | D.Lat Dep.                 |
|          | _            |              |            | <u> </u>     |                |            |                |              |            |                |        | <u> </u>   | <u> </u>                   |
| 1 2      | 0.7          | 0.7          | 61<br>62   |              | 43.1<br>43.8   | 121<br>122 | 85.6<br>86.3   | 85.6<br>86.3 | 181        | 128.0          | 128.0  | 241<br>242 | 170.4 170.4<br>171.1 171.1 |
| 3        | 2.1          | 2.1          | 63         |              | 14.5           |            | 87.0           |              | 183        |                | 129.4  | 243        | 171.8 171.8                |
| 4        | 2.8          | 2.8          | 64         | 45.3         | 45.3           | 124        | 87.7           | 87.7         | 184        | 130.1          |        | 244        | 172.5 172.5                |
| 5        | 3.5          | 3.5          | 65         | 46.0         | 46.0           | 125        | 88.4           |              | 185        | 130.8          |        | 245        | 173.2 173.2                |
| 6        | 4.2          | 4.2          | 66         |              | 46.7           | 126        | 89.1           | 89.1         | 186        | 131.5          |        | 246        | 173.9 173.9                |
| 7        | 4.9          | 4.9          | 67         |              | 47.4           | 127        | 89.8           | 89.8         | 187        | 132.2          |        | 247        | 174.7 174.7                |
| 8        | 5.7          | 5.7          | 68         | 48.1         | 48.1           | 128        | 90.5           | 90.5         | 188        | 132.9          | 132.9  | 248        | 175.4 175.4                |
| 9        | 6.4          | 6.4          | 69         |              | 48.8           | 129        | 91.2           | 91.2         | 189        | 133.6          |        | 249        | 176.1 176.1                |
| 10       | 7.1          | 7.1          | 70         | 49.5         | 49.5           | 130        | 91.9           | 91.9         | 190        | 134.4          | 134.4  | 250        | 176.8 176.8                |
| 11       | 7.8          | 7.8          | 71         | 50.2         | 50.2           | 131        | 92.6           | 92.6         | 191        | 135.1          | 135.1  | 251        | 177.5 177.5                |
| 12       | 8.5          | 8.5          | 72         |              | 50.9           | 132        | 93.3           | 93.3         | 192        | 135.8          |        | 252        | 178.2 178.2                |
| 18       | 9.2          | 9.2          | 73         |              | 51.6           | 133        | 94.0           |              |            | 136.5          |        | 253        | 178.9 178.9                |
| 14       | 99           | 9.9          | 74         |              | 52.3           | 134        | 94.8           |              |            | 137.2          |        | 254        | 179.6 179.6                |
| 15       | 10.6         | 10.6         | . 75       | <b>5</b> 3.0 | 53.0           | 135        | 95.5           | 95.5         | 195        | 137.9          | 137.9  | 255        | 180.3 180.3                |
| 16       | 11.3         | 11.3         | 76         |              | 53.7           | 136        | 96.2           | 96.2         | 196        | 138.6          | 138.6  | 256        | 181.0 181.0                |
| 17       | 12.0         | 12.0         | 77         |              | 54.4           | 137        | 96.9           | 96.9         | 197        | 139.3          |        | 257        | 181.7 181.7                |
| 18       | 12.7         |              | 78         |              | 55.2           | 138        | 97.6           | 97.6         | 198        | 140.0          |        | 258        | 182.4 182.4                |
| 19       | 13.4         | 13.4         | 79         |              | 55.9           | 139        | 98.3           | 98.3         | 199        | 140.7          |        | 259        | 183.1 183.1                |
| 20       | 14.1         | 14.1         | 80         | 56.6         | 56.6           | 140        | 99.0           | 99.0         | 200        | 141.4          | 141.4  | 260        | 183.8 183.8                |
| 21       | 14.8         | 14.8         | 81         | 57.3         | 57.3           | 141        | 99.7           | 99.7         | 201        | 142.1          | 142.1  | 261        | 184.6 184.6                |
| 22       | 15.6         | 15.6         |            |              | 58.0           | 142        |                | 100.4        | 202        | 142.8          | 142.8  | 262        | 185.3 185.3                |
| 23       | 16.3         | 16.3         | 83         | 58.7         | 58.7           | 143        | 101.1          | 101.1        | 203        | 143.5          | 149.5  | 263        | 186.0 186.0                |
| 24       | 17.0         |              | 84         |              | 59.4           | 144        |                | 101.8        |            | 144.2          |        | 264        | 186.7 186.7                |
| 25       | 17.7         | 17.7         | 85         | 60.1         |                | 145        | 102.5          |              |            | 145.0          |        | 265        | 187.4 187.4                |
| 26       | 18.4         | 18.4         | 86         |              | 60.8           | 146        | 103.2          |              |            | 145.7          |        | 266        | 188.1 188.1                |
| 27<br>28 | 19.1         | 19.1         | 87         | 61.5         |                | 147        | 103.9          |              |            | 146.4          |        | 267        | 188.8 183.8                |
| 29       | 19.8<br>20.5 | 19.8<br>20.5 | 88 .<br>89 |              | $62.9 \\ 62.9$ | 148        | 104.7<br>105.4 |              | 208<br>209 | 147#1<br>147.8 |        | 268        | 189.5 189.5<br>190.2 190.2 |
| 30       | 21.2         | 21.2         | 90         | 63.6         |                | 150        | 106.1          |              | 210        | 148.5          |        | 269<br>270 | 190.9 190.9                |
|          |              |              | <u> </u>   |              |                |            |                |              |            |                |        |            |                            |
| 31       | 21.9         | 21.9         | 91         | 64.3         |                | 151        | 106.8          |              | 211        | 149.2          |        | 271        | 191.6 191.6                |
| 32       | 22.6         | 22.6         | 92         | 65.1         |                | 152        | 107.5          |              |            | 149.9          |        | 272        | 192.3 192.3<br>193.0 193.0 |
| 33<br>34 | 23.3<br>24.0 | 23.3 $24.0$  | 93         | 65.8         |                | 153<br>154 | 108.2<br>108.9 |              | 213<br>214 | 150.6<br>151.3 |        | 273        | 193.0193.0                 |
| 35       | 24.7         | 24.7         | 94<br>95   | 67.2         | 66.5           | 155        |                | 109.6        |            | 152.0          |        | 274<br>275 | 194.5 194.5                |
| 36       | 25.5         | 25.5         | 96         |              | 67.9           |            | 110.3          |              |            | 152.7          |        | 276        | 195.2 195.2                |
| 37       | 26.2         | 26.2         | 97         |              | 68.6           | 157        | 111.0          |              | 217        | 153.4          |        | 277        | 195.9 195.9                |
| 38       | 26.9         | 26.9         | 98         | 69.3         |                |            | 111.7          |              | 218        | 154.1          |        | 278        | 196.6 196.6                |
| 39       | 27.6         | 27.6         | 99         | 70.0         |                | 159        | 112.4          |              | 219        | 154.9          |        | 279        | 197.3 197.3                |
| . 40     | 28.3         | 28.3         | 100        | 70.7         | 70.7           | 160        | 113.1          | 113.1        | 220        | 155.6          | 155.6  | 280        | 198.0 198.0                |
| 41       | 29.0         | 29.0         | 101        | 71.4         | 71 4           | 161        | 113.8          | 119 8        | 221        | 156.3          | 156 9  | 281        | 198.7 198.7                |
| 42       | 29.7         | 29.7         | 102        | 72.1         |                | 162        | 114.6          |              | 222        | 157.0          |        | 282        | 199.4 199.4                |
| 43       | 30.4         | 30.4         | 103        | 72.8         |                | 163        | 115.3          |              |            | 157.7          |        | 283        | 200.1 200.1                |
| 44       | 31.1         | 31.1         | 104        | 73.5         |                | 164        | 116.0          |              | 224        | 158.4          |        | 284        | 200.8 200.8                |
| 45       | 31.8         | 31.8         | 105        |              | 74.2           | 165        | 116.7          | 116.7        | 225        | 159.1          |        | 28.5       | 201.5 201.5                |
| 46       | 32.5         | 32.5         | 106        | 75.0         |                |            | 117.4          |              |            | 159.8          |        | 286        | 202.2 202.2                |
| 47       | 33.2         | 33.2         | 107        | 75.7         |                | 167        | 118.1          | :            | 227        | 160.5          |        | 287        | 202.9 202.9                |
| 48       | <b>3</b> 3.9 | 33.9         | 108        | 76.4         |                |            | 118.8          |              | 228        | 161.2          |        | 288        | 203.6 203.6                |
| 49       | 34.6         | 34.6         | 109        | 77.1         |                |            | 119.5          |              | 229        | 161.9          |        | 289        | 204.4 204.4<br>205.1 205.1 |
| 50       | <b>3</b> 5.4 | 35.4         | 110        | 77.8         | 77.8           | 170        | 120.2          | 120.2        | 230        | 162.6          | 162.6  | 290        | ·                          |
| 51       | 36.1         | 36.1         | 111        |              | 78.5           |            | 120.9          |              | 231        | 163.3          | 163.3  | 291        | 205.8 205.8                |
| 52       | 36.9         |              |            |              |                |            | 121.6          |              | 232        | 164.0          | 164.0  | 292        | 206,5 206.5                |
| 53       | <b>37</b> ,5 |              |            |              | 79.9           |            |                | 122.3        | 233        | 164.8          | 164.8  | 293        | 207.2 207.9                |
| 54       | 33.2         |              |            |              | 80.6           | 17-1       | 123.0          |              | 234        | 165.5          |        | 294        | 207.9 207.9                |
| 55       | 38.9         |              |            |              | 81.3           |            | 123.7          |              | 235        | 166.2          |        | 295        | 208.6 208.6                |
| 56       | \$9.6        |              |            |              | 82.0           | 176        | 124.5          |              | 236        | 166.9          |        | 296        | 209.3 209.3                |
| 57<br>58 | 40.3         | 40.3         | 117        |              | 82.7           | 177<br>178 | 125.2          |              | 237<br>258 | 169.6          |        | 297        | 210.0210.0<br>210.7210.7   |
| 59       | 41.0<br>41.7 | 41.0         | 118<br>119 | 84.1         |                | 179        | 125.9<br>126.6 |              | 239        | 168.3<br>169.0 |        | 298<br>299 | 211.4211.4                 |
| 60       | 42.4         |              |            |              | 84.9           |            | 127.3          |              |            | 169.7          |        | 300        | 212.1 212.1                |
|          |              |              |            |              | 'I             | ·          | ·              |              |            | !              |        | <b>'</b>   |                            |
| Dist.    | Dep.         | D.Dat        | Dist.      | Dep.         | D.lati         | Dist.      | Dep.           | D.Lat        | Dist.      | Dep.           | D.Lat  | Dist.      | Dep. D.Lat                 |

## TABLE XIII. TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

| 1 Degree.  |              |       |                 |                |            |            |                |         |            |                |          |            |                |            |
|------------|--------------|-------|-----------------|----------------|------------|------------|----------------|---------|------------|----------------|----------|------------|----------------|------------|
| Dist.      | D.Lat        | Dep.  | Dist.           | D.Lat          | Dep.       | Dist.      | D.Lat          | Dep.    | Dist.      | DLat           | Dep.     | Dist.      | D.Lat          | Dep.       |
| 1          | 1 0          | 0.0   | 61              | 61.0           | 1.1        | 121        | 121.0          | 2.1     | 181        | 181.0          | 3.2      | 241        | 241.0          | 4.2        |
| 2          | 1.0          | -     | 61<br><b>62</b> | 62.0           |            | 121        | 122.0          | 2.1     | 182        | 182.0          |          | 242        | 242.0          |            |
| 3          | 3.0          | 0.0   | 63              | 63.0           | 1.1        | 123        | 123.0          | 2.1     | 183        | 183.0          |          | 243        | 243.0          | 4.2        |
| 4          | 4.0          | 0.1   | 64              | 64.0           | 1.1        | 124        | 124.0          | 2.2     | 184        | 184.0          |          | 244        | 244.0          | 4.3        |
| 5          | 5.0          | 0.1   | 65              | 65.0           | 1.1        | 125        | 125.0          | 2.2     | 185        | 185.0          | 3.2      | 245        | 245.0          | 4.3        |
| 6          | 6.0          | 0.1   | 66.             | 66.0           | 1.2        | 126        | 126.0          | 2.2     | 186        | 186.0          |          | 246        | 246.0          | 4.3        |
| 7          | 7.0          | 0.1   | 67              | 67.0           | 1.2        | 127        | 127.0          | 2.2     | 187        | 187.0          |          | 247        | 247.0          | 4.3        |
| 8          | 8.0          | 0.1   | 68              | 68.0           | 1.2        | 128        | 128.0          | 2.2     | 188        | 188.0          |          | 248        | 248.0          | 4.3        |
| 9          | 9.0          | 0.2   | 69              | 69.0           | 1.2        | 129        | 129.0          |         | 189        | 189.0          |          | 249        | 249.0          | 4.3        |
| 10         | 10.0         | 0.2   | 70              | 70.0           | 1.2        | 130        | 130.0          | 2.3     | 190        | 190.0          | 3.3      | 250        | 250.0          | 4.4        |
| 10         | 10.0         | 0.2   | 10              | 70.0           | 1.2        | 150        | 130.0          | 2.3     | 130        | 130.0          | 3.3      | 250        | 250.0          | 7.7        |
| 11         | 11.0         | 0.2   | 71              | 71.0           | 1.2        | 131        | 131.0          | 2.3     | 191        | 191.0          | 3.3      | 251        | 251.0          | 4.4        |
| 12         | 12.0         | 0.2   | 72              | 72.0           | 1.3        | 132        | 132.0          | 2.3     | 192        | 192.0          | 3.4      | 252        | 252.0          | 4.4        |
| 13         | 13.0         | 0.2   | 73              | 73.0           | 1.3        | 133        | 133.0          | 2.3     | 193        | 193.0          | 3.4      | 253        | 253.0          | 4.4        |
| 14         | 14.0         | 0.2   | 74              | 74.0           | 1.3        | 134        | 134.0          | 2.3     | 194        | 194.0          | 3.4      | 254        | 254.0          | 4.4        |
| 15         | 15.0         | 0.3   | 75              | 75.0           | 1.3        | 135        | 135.0          |         | 195        | 195.0          | 3.4      | 255        | 255.0          | 4.5        |
| 16         | 16.0         | 0.3   | 76              | 76.0           | 1.3        | 136        | 136.0          |         | 196        | 196.0          |          | 256        | 256.0          | 4.5        |
| 17         | 17.0         | 0.3   | 77              | 77.C           | 1.3        | 137        | 137.0          | 2.4     | 197        | 197.0          | 3.4      | 257        | 257.0          | 4.5        |
| 18         | 18.0         | 0.8   | 78              | 78.0           | 1.4        | 138        | 138.0          |         | 198        | 198.0          | 3.5      | 258        | 258.0          | 4.5        |
| 19         | 19.0         | 0.3   | 79              | 79.0           | 1.4        | 139        | 139.0          | 2.4     | 199        | 199.0          | 3.5      | 259        | 259.0          | 4.5        |
| 20         | 20.0         | 0.3   | 80              | 80.0           | 1.4        | 140        | 140.0          | 2.4     | 200        | 200.0          | 3.5      | 260        | 260.0          | 4.5        |
| 21         | 01.0         |       | -               | 91.0           |            | 141        | 141 0          | 2.5     | 001        | 001.0          |          | 001        | 001 0          | 4.6        |
| 22         | 21.0         | 0.4   | 81              | 81.0           | 1.4        | 141        | 141.0          |         | 201        | 201.0          | 3.5      | 261        | 261.0          | 4.6        |
|            | 22.0         | 0.4   | 82              | 82.0           | 1.4        | 142        | 142.0          |         | 202        | 202.0          | 3.5      | 262        | 262.0          | 4.6        |
| 23         | 23.0         | 0.4   | 83              | 83.0           | 1.4        | 143        | 143.0          |         | 203        | 203.0          |          | 263        | 263.0          | 4.6        |
| 24         | 24.0         | 0.4   | 84              | 84.0           | 1.5        | 144        | 144.0          |         | 204        | 204.0          | 3.6      | 264        | 264.0          | 4.6        |
| 25         | 25.0         | 0.4   | 85              | 85.0           | 1.5        | 145        | 145.0          | 2.5     | 205        | 205.0          | 3.6      | 265        | 265.0          | 4.6        |
| 26         | 26.0         | 0.5   | 86              | 86.0           | 1.5        | 146        | 146.0          | 2.5     | 206        | 206.0          | 3.6      | 266        | 266.0          | 4.6        |
| 27<br>28   | 27.0         | 0.5   | 87              | 87.0           | 1.5        | 147        | 147.0          | 2.6     | 207        | 207.0          | 3.6      | 267        | 267.0          | 4.7        |
| 29         | 28.0         | 0.5   | 88              | 88.0           |            | 148        | 148.0          |         | 208        | 208.0          | 3.6      | 268        | 268.0          | 4.7        |
| 30         | 29.0         | 0.5   | 89              | 89.0           | 1.6        | 149        | 149.0          | 2.6     | 209        | 209 0          | 3.6      | 269        | 269.0          | 4.7        |
| 30         | 30.0         | 0.5   | 90              | 90.0           | 1.6        | 150        | 150.0          | 2.6     | 210        | 210.0          | 8.7      | 270        | 270.0          | 4.7        |
| 31         | 31.0         | 0.5   | 91              | 91.0           | 1.6        | 151        | 151.0          | 2.6     | 211        | 211.0          | 3.7      | 271        | 271.0          | 4.7        |
| 32         | 32.0         | 0.6   | 92              | 92.0           | 1.6        | 152        | 152.0          | 2.7     | 212        | 212.0          | 3.7      | 272        | 272.0          | 4.7        |
| 33         | 33.0         | 0.6   | 93              | 93.C           | 1.6        | 153        | 153.0          | 2.7     | 213        | 213.0          | 3.7      | 273        | 273.0          | 4.8        |
| 34         | 34.0         | 0.6   | 94              | 94.0           | 1.6        | 154        | 154.0          | 2.7     | 214        | 214.0          | 3.7      | 274        | 274.0          | 4.8        |
| 35         | 85.0         | 0 6   | 95              | 95.0           | 1.7        | 155        | 155.0          | 2.7     | 215        | 215.0          | 3.8      | 275        | 275.0          | 4.8        |
| 36         | 36.0         | 0.6   | 96              | 96.0           | 1.7        | 156        | 156.0          | 2.7     | 216        | 216.0          | 3.8      | 276        | 276.0          | 4.8        |
| 37         | 37.0         | 0.6   | 97              | 97.0           | 1.7        | 157        | 157.0          | 2.7     | 217        | 217.0          | 3.8      | 277        | 277.0          | 4.8        |
| 38         | 38.0         | 0.7   | 98              | 98.0           | 1.7        | 158        | 158.0          | 2.8     | 218        | 218.0          | 3.8      | 278        | 278.0          | 4.9        |
| 39         | 39.0         | 0.7   | 99              | 99.0           | 1.7        | 159        | 159.0          | 2.8     | 219        | 219.0          | 3.8      | 279        | 279.0          | 4.9        |
| 40         | 40.0         | 0.7   | 100             | 100.0          | 1.7        | 160        | 160 0          | 2.8     | 220        | 220.0          | 3.8      | 280        | 280.0          | 4.9        |
| 41         |              |       | 1 1/21          | 101 0          |            | 101        | 101 0          |         | 001        | 001 0          |          | 001        | 1001 0         |            |
| 42         | 41.0         | 0.7   | 101             | 101.0          | 1.8        | 161        | 161.0          | 2.8     | 221        | 221.0          | 3.9      | 281<br>282 | 281.0          | 4.9        |
|            | 42.0         | 0.7   | 102             | 102.0          | 1.8        | 162        | 162.0          | 2.8     | 222        | 222.0          | 3.9      |            | 282.0          | 4.9        |
| 43<br>44   | 43.0         | 0.8   | 103<br>104      | 103.0          | 1.8        | 163        | 163.0<br>164.0 | 2.8     | 223<br>224 | 223.0          | 3.9      | 283<br>284 | 283.0          | 4.9<br>5.0 |
| 45         | 44.0         | 0.8   | 104             | 104.0          | 1.8        | 164        |                | 2.9     | 224        | 224.0          | 3.9      | 285        | 284.0<br>285.0 |            |
| 46         | 45.0         | 0.8   | 105             | 105.0          | 1.8        | 165<br>166 | 165.0<br>166.0 | 2.9     | 225        | 225.0<br>226.0 | 3.9      | 286<br>286 | 286.0          | 5.0<br>5.0 |
| 47         | 46.0         | 0.8   | 107             | 106.0<br>107.0 | 1.8        | 167        | 167.0          | 2.9     | 227        | 227.0          | 4.0      | 287        | 287.0          | 5.0        |
| 48         | 47.0<br>48.0 | 0.8   | 107             | 108.0          | 1.9<br>1 9 | 168        | 168.0          | 2.9     | 228        | 227.0<br>228.0 | 4.0      | 288        | 288.0          | 5.0        |
| 49         | 49.0         | 0.8   | 108             | 109.0          | 1.9        | 169        | 169.0          | 2.9     | 229        | 229.0          | 4.0      | 289        | 289.0          | 5.0        |
| 50         |              | 0.9   | 110             | 110.0          | 1.9        | 170        | 170.0          | 3.0     | 230        | 230.0          | 4.0      | 290        | 290.0          | 5.1        |
|            | 50.0         | 0.9   | .10             | .10.0          | 1.9        | L          | 2.0.0          | 5.0     |            | 200.0          |          | 230        | 255.0          |            |
| 51         | 51.0         | 0.9   | 111             | 111.0          | 1.9        | 171        | 171.0          | 3.0     | 231        | 231.0          | 4.0      | 291        | 291.0          | 5.1        |
| 52         | 52.0         | 0.9   | 112             | 112.0          | 2.0        | 172        | 172.0          | 3.0     | 232        | 232.0          | 4.0      | 292        | 292.0          | 5.1        |
| 53         | 53.0         | 0.9   | 113             | 113.0          | 2.0        | 173        | 173.0          | 3.0     | 233        | 233.0          | 4.1      | 293        | 293.0          | 5.1        |
| 54         | 54 0         | 0.9   |                 | 114.0          | 2.0        | 174        | 174.0          | 3.0     | 234        | 234.0          | 4.1,     | 294        | 294.0          | 5.1        |
| <b>5</b> 5 | 55.0         | 1.0   | 115             | 115.0          | 2.0        | 175        | 175.0          | 3.1     | 235        | 235.0          | 4.1      | 295        | 295.0          | 5.1        |
| 56         | 56.0         | 1.0   | 116             | 116.0          | 2.0        | 176        | 176.0          | 3.1     | 236        | 236.0          | 4.1      | 296        | 296.0          | 5.2        |
| 57         | 57.0         | 1.0   | 117             | 117.0          | 2.0        | 177        | 177.0          | 3.1     | 237        | 237.0          | 4.1      | 297        | 297.0          | 5.2        |
| 58         | 58.0         | 1.0   | 118             | 118.0          | 2.1        | 178        | 178.0          | 3.1     | 238        | 238.0          | 4.2      | 298        | 298.0          | 5.2        |
| 59         | 59.0         | 1.0   | 119             | 119.0          | 2.1        | 179        | 179.0          | 3.1     | 239        | 239.0          | 4.2      | 299        | 299.0          | 5.2        |
| 60         | 60.0         | 1.0   | 120             | 120.0          | 2.1        | 180        | 180.0          | 3.1     | 240        | 240.0          | 4.2      | 300        | 300.0          | 5.2        |
| Dist.      | De           | DI -  | Dia             | De             | <u> </u>   | Dine       | Dep.           | D I at  | Dist.      | Den            | 1) los   | Dies       | Dep.           | 117.00     |
|            | Dep.         | D.Lat | . 138F.         | Dep.           | v.Lat'     | 7,120.     | Deb.           | 1. mg() | 17151.     | Deb.           | المالادر | A-151.     | Deb.1          | اعدد       |

TABLE XIII.
TRAVERSE TABLE. TO EACH DEGREE OF THE QUADRANT.

| 2 Degrees.               |              |       |            |                |            |            |                |            |            |                |       |            |                |        |
|--------------------------|--------------|-------|------------|----------------|------------|------------|----------------|------------|------------|----------------|-------|------------|----------------|--------|
| Dist                     | D.Lat        | Dep.  | Dist.      | D.Lat          | Dep.       |            |                |            | Dist.      | D.Lat          | Dep.  | Dist.      | DLat           | Dep.   |
| 1                        | 1.0          | 0.0   | 61         | 61.0           | 2.1        | 121        | 120.9          | 4.2        | 181        | 180.9          | 6.3   | 241        | 240.9          | 8.4    |
| 2 3                      | 2.0<br>3.0   |       | 62         | 62.0           | 2.2        | 122        | 121.9          | 4.3        | 182        | 181.9          | 6.4   | 242        | 241.9          | 8.4    |
| 4                        | 4.0          | 0.1   | 63<br>64   | 63.0<br>64.0   | 2.2        | 123<br>124 | 122.9<br>123.9 | 4.3        | 183        | 182.9          | 6.4   | 243        | 242.9          | 8.5    |
| 5                        | 5.0          | 0.2   | 65         | 65.0           | 2.3        | 125        | 124.9          | 4.3        | 184<br>185 | 183.9<br>184.9 | 6.4   | 244<br>245 | 243.9<br>244.9 | 8.5    |
| 6                        | 6.0          | 0.2   | 66         | 66.0           | 2.3        | 126        | 125.9          | 4.4        | 186        | 185.9          | 6.5   | 246        | 245.9          | 8.6    |
| 7                        | 7.0          | 0.2   | 67         | 67.0           | 2.3        | 127        | 126.9          | 4,4        | 187        | 186.9          | 6.5   | 247        | 246.8          | 8.6    |
| 8                        | 8.0          | 0.3   | 68         | 68.0           | 2.4        | 128        | 127.9          | 4.5        | 188        | 187.9          | 6.6   | 248        | 247.8          | 8.7    |
| 9                        | 9.0          | 0.3   | 69         | 69.0           | 2.4        | 129        | 128.9          | 4.5        | 189        | 188.9          | 6.6   | 249        | 248.8          | 8.7    |
| 10                       | 10.0         | 0.3   | 70         | 70.0           | 2.4        | 130        | 129.9          | 4.5        | 190        | 189.9          | 6.6   | 250        | 249.8          | 8.7    |
| 11<br>12                 | 11.0         | 0.4   | 71<br>72   | 71.0           | 2.5        | 131        | 130.9          | 4.6        | 191        | 190.9          | 6.7   | 251        | 250.8          | 8.8    |
| 13                       | 13.0         | 0.5   | 73         | 72.0<br>73.0   | 2.5        | 132        | 131.9<br>132.9 | 4.6        | 192        | 191.9<br>192.9 | 6.7   | 252<br>253 | 251.8<br>252.8 | 8.8    |
| 14                       | 14.0         | 0.5   | 74         | 74.0           | 2.6        | 134        | 133.9          | 4.7        | 194        | 193.9          | 6.8   | 254        | 253.8          | 8.9    |
| 15                       | 15.0         | 0.5   | 75         | 75.0           | 2.6        | 135        | 134.9          | 4.7        | 195        | 194.9          | 6.8   | 255        | 254.8          | 8.9    |
| 16                       | 16.0         | 0.6   | 76         | 76.0           | 2.7        | 136        | 135.9          | 4.7        | 196        | 195.9          | 6.8   | 256        | 255.8          | 8 9    |
| 17                       | 17.0         | 0.6   | 77         | 77.0           | 2.7        |            | 136.9          | 4.8        | 197        | 196.9          | 6.9   | 257        | 256.8          | 9.0    |
| 18<br>19                 | 18.0         | 0.6   | 78         | 78.0           | 2.7        | 138        | 137.9          | 4.8        | 198        | 197.9          | 6.9   | 258        | 257.8          | 9.0    |
| 20                       | 19 0<br>20.0 | 0.7   | 79         | 76.0           |            | 139        | 138.9          | 4.9        | 199        | 198.9          | 6.9   | 259        | 258.8          | 9.0    |
|                          | '            |       |            | ·              | 2.8        | 140        | 139.9          | 4.9        | 200        | 199.9          | 7.0   | 260        | 259.8          | 9.1    |
| 21<br>82                 | 21.0         |       | 81         | 81.0           | 2.8        | 141        | 140.9          | 4.9        | 201        | 200.9          | 7.0   | 261        | 260.8          | 9.1    |
| 23                       | 22.0<br>23.0 | 0.8   | 82<br>83   | 82.0<br>82.9   | 2.9        | 142<br>143 | 141.9<br>142.9 | 5.0<br>5.0 | 202        | 201.9<br>202.9 | 7.0   | 262        | 261.8          | 9.1    |
| 24                       | 21.0         | 0.8   | 84         | 83.9           | 2.9        | 144        | 143.9          | 5.0        | 203        | 203.9          | 7.1   | 263<br>264 | 262.8<br>263.8 | 9.2    |
| 25                       | 25.0         |       | 85         | 84.9           | 3.0        | 145        | 144.9          | 5.1        | 205        | 204.9          | 7.2   | 265        | 264.8          | 9.2    |
| 26                       | 26.0         | 0.9   | 86         | 85.9           | 3.0        | 146        | 145.9          | 5.1        | 206        | 205.9          | 7.2   | 266        | 265.8          | 9.3    |
| 27                       | 27.0         | 1     | 87         | 86.9           | 3.0        | 147        | 146.9          | 5.1        | 207        | 206.9          | 7.2   | 267        | 266.8          | 9.3    |
| 28                       | 28.0         | 1.0   | 88         | 87.9           | 3.1        | 148        | 147.9          | 5.2        | 908        | 207.9          | 7.3   | 268        | 267.8          | 9.4    |
| 29<br>30                 | 29.0<br>30.0 |       | .90        | 88.9           | 3.1        | 149        | 148.9          | 5.2        | 209        | 208.9          | 7.8   | 269        | 268.8          | 9.4    |
| ·!                       |              |       |            | 89.9           | 3.1        | 150        | 149.9          | 5.2        | 210        | 209.9          | 7.8   | 270        | 269.8          | 9.4    |
| 31                       | 31.0         |       | 91         | 90.9           | 3 2        | 151        | 150.9          | 5.3        | 211        | 210.9          | 7.4   | 271        | 270.8          | 9.5    |
| <b>3</b> 2<br><b>3</b> 3 | 32.0<br>33.0 |       | 92         | 91.9           | 3.2        | 152        | 151.9          | 5.3        | 212        | 211.9          | 7.4   | 272        | 271.8          | 9.5    |
| 33                       | 34.0         |       | 93<br>94   | 92.9<br>93 9   | 5.2<br>3.5 | 153<br>154 | 152.9<br>153.9 | 5.3        | 213<br>214 | 212.9<br>213.9 | 7.4   | 273<br>274 | 272.8          | 9.5    |
| 35                       | 35.0         |       | 95         | 94.9           | 3.3        | 155        | 154.9          | 5.4        | 215        | 214.9          | 7.5   | 275        | 273.8<br>274.8 | 9.6    |
| 36                       | 36.0         |       | 96         | 95.9           | 3.4        | 156        | 155.9          | 5.4        | 216        | 215.9          | 7.5   | 276        | 275.8          | 9.6    |
| 87                       | 37.0         | 1.3   | 97         | 96.9           | 3.4        | 157        | 156.9          | 5.5        | 217        | 216.9          | 7.6   | 277        | 276.8          | 9.7    |
| <b>S</b> 8               | 38.0         |       | 98         | 97.9           | 3.4        | 158        | 157.9          | 5.5        | 218        | 217.9          |       | 278        | 277.8          | 9.7    |
| 39<br>40                 | 39.0         | 1.4   | 99         | 98.9           | 3.5        | 159        | 158.9          | 5.5        | 219        | 218.9          |       | 279        | 278.8          | 9.7    |
|                          | 40.0         | 1.4   | 100        | 99.9           | 3.5        | 160        | 159.9          | 5.6        | 220        | 219.9          | 7.7   | 280        | 279 8          | 9.8    |
| 41                       | 41.0         | 1.4   | 101        | 100.9          | 3.5        | 161        | 160.9          | 5.6        | 221        | 220.9          | 7.7   | 281        | 280.8          | 9.8    |
| 42<br>43                 | 42.0<br>43.0 | 1.5   | 102        | 101.9          | 3.6        | 162        | 161.9          | 5.7        | 222        | 221.9          | 7.7   | 282        | 281.8          | 9.8    |
| 44                       | 44.0         |       | 103<br>104 | 102.9<br>103.9 | 3.6<br>3.6 | 163<br>164 | 162.9<br>163.9 | 5.7        | 223<br>224 | 222.9<br>223.9 | 7.8   | 283        | 282.8          | 9.9    |
| 45                       | 45.0         |       | 105        | 103.9          | 3.7        | 165        | 164.9          | 5.7<br>5.8 | 224        | 223.9          | 7.8   | 284<br>285 | 283.8<br>284.8 | 9.9    |
| 46                       | 46.0         | 1.6   | 106        | 105.9          | 3.7        | 166        | 165.9          | 5.8        | 226        | 225.9          | 7.9   | 286        | 285.8          |        |
| 47                       | 47.0         | 1.6   | 107        | 106.9          | 3.7        | 167        | 166.9          | 5.8        | 227        | 226.9          | 7.9   | 287        | 286.8          |        |
| 48                       | 48.0         | 1.7   | 108        | 107.9          | 3.8        | 168        | 167.9          | 5.9        | 228        | 227.9          | 8.0   | 288        | 287.8          |        |
| 49<br>50                 | 49.0         | 1.7   | 109        | 108.9          | 3.8        | 169        | 168.9          | 5.9        | 229        | 228.9          | 8.0   | 289        | 288 8          |        |
|                          | 50.0         | 1.7   | 110        | 109.9          | 3.8        | 170        | 169.9          | 5.9        | 230        | 229.9          | 8.0   | 290        | 289.8          |        |
| 51                       | 51.0         | 1.8   |            | 110.9          | 3.9        | 171        | 170.9          |            | 231        | 230.9          | 8,1   | 291        | 290.8          |        |
| 52<br>53                 | 52.0         |       |            | 111.9          |            | 172        | 171.9          |            | 232        | 231.9          |       |            | 291.8          |        |
| 53<br>54                 | 53.0<br>54.0 | 1.8   |            | 112.9          |            | 173        | 172.9          |            |            | 232.9          |       |            | 292.8          |        |
| 55                       | 55.0         |       |            | 113.9<br>114:9 | 4.0        | 174        | 173.9          |            | 234<br>235 | 288.9          |       | 294        | 293.8<br>294.8 |        |
| 56                       | 56.0         |       | 11         | 115.9          |            | 176        | 174.9 $175.9$  |            | 236        | 234.9<br>235.9 |       | 295<br>296 | 295.8          |        |
| 57                       | <i>5</i> 7 0 |       |            | 116.9          |            | 177        | 176.9          |            | 237        | 236.9          |       | 297        | 296.8          |        |
| 58                       | 58.0         | 2.0   | 118        | 117.9          | 4.1        | 178        | 177.9          |            | 238        | 237.9          | 8.3   | 298        | 297.8          | 10.4   |
| 59                       | 59.0         |       | 119        | 118.9          |            | 179        | 178.9          |            | 239        | 238.9          | 1 1   | 299        | 298.8          |        |
| 60                       | 60.0         |       |            | 119.9          | '          | 180        | 179.9          | . 1        | 240        | 239.9          | 1 1   | 300        | 299.8          |        |
| Dist.                    | Dep.         | D.Lat | Dist.      | Dep.           | DLat       | Dist.      | Dep.           | D.Lat      | Dist.      | Dep.           | D.lat | Dist.      | Dep.           | D.L.at |
| 1                        |              |       |            |                |            | *          | 8 Deur         | W.         |            |                |       |            |                |        |

| -        |              |                   |            | _              | -   | 3          | Degre          | es. `        |                     | <del></del>    |       |            |                |                              |
|----------|--------------|-------------------|------------|----------------|---|------------|----------------|--------------|---------------------|----------------|-------|------------|----------------|------------------------------|
| Dist     | D.Lat        | Dep.              | Dist.      | D.Lat          | Dep.                                      | _          | D.Lat          |              | Dist.               | D.Lat          | Dep   | Dist.      | DLat           | Dep.                         |
| 1        | 1.0          | 0.1               | 61         | 60.9           | 3.2                                       | 121        | 120.8          | 6.3          | 181                 | 180.7          | 9.5   | 241        | 240.7          | 12.6                         |
| 2        | 2.0          | 0.1               | 62         | 61.9           | 3.2                                       | 122        | 121.8          |              | 182                 | 181.7          |       | 242        | 241.7          | 12.7                         |
| 3        | 3.0          | 0.2               | 63         | 62.9           | 3.3                                       |            | 122.8          |              | 183                 | 182.7          | 9.6   | 248        | 242.7          | 12.7                         |
| 5        | 4.0          | 0.2               | 64         | 63.9           | 3.3                                       | 124        | 123.8          | 6.5          | 184                 | 183.7<br>184.7 | 9.6   | 244        | 243.7          | 12.8<br>12.8                 |
| 6        | 5.0<br>6.0   | 0.3               | 65<br>66   | 64.9           | 3.4<br>3.5                                | 125<br>126 | 124.8<br>125.8 | 6.5          | 185<br>186          | 185.7          | 9.7   | 245<br>246 | 244.7<br>245.7 | 12.8                         |
| 7        | 7.0          | 0.4               | 67         | 66.9           | 3.5                                       | 127        | 126.8          | 6.6          | 187                 | 186.7          | 9.8   | 247        | 246.7          | 12.9                         |
| -8       | 8.0          | 0.4               | 68         | 67.9           | 3.6                                       |            | 127.8          | 6.7          | 188                 | 187.7          | 9.8   | 248        | 247.7          | 13.0                         |
| 9        | 9.0          | 0'.5              | 69         | 68.9           | 3.6                                       | 129        | 128.8          | 6.8          | 189                 | 188.7          |       | 249        | 248.7          | 13.0                         |
| 10       | 10.0         | 0.5               | 70         | 69.9           | 3.7                                       | 130        | 129.8          | 6.8          | 190                 | 189.7          | 9.9   | 250        | 249.7          | 13.1                         |
| 11       | 11.0         | 0.6               | 71         | 70.9           | 3.7                                       | 131        | 130.8          | 6.9          | 191                 | 190.7          | 10.0  | 251        | 250.7          | 13.1                         |
| 12       | 12.0         | 0.6               | 72         | 71.9           | 3.8                                       | 132        | 131.8          | 6.9          | 192                 | 191.7          | 10.0  | 252        | 251.7          | 13.2                         |
| 13       | 15.0         | 0.7               | 73         | 72.9           | 3.8                                       |            | 132.8          | 7.0          | 193                 | 192.7          |       | 253        | 252.7          | 13.2                         |
| 14<br>15 | 14.0         | 0.7               | 74         | 73.9<br>74.9   | 3.9                                       |            | 133.8          | 7.0          | 194                 | 193.7          |       | 254        | 258.7<br>254.7 | 13.3                         |
| 16       | 15.0<br>16.0 | 0.8               | 75<br>76   | 75.9           | 3.9<br>4.0                                |            | 134.8<br>135.8 | $7.1 \\ 7.1$ | 195<br>1 <b>9</b> 6 | 194.7<br>195.7 |       | 255<br>256 | 255.6          | 13.3<br>13.4                 |
| 17       | 17.0         | 0.9               | 77         | 76.9           | 4.0                                       |            | 136.8          | 7.2          | 197                 | 196.7          |       | 257        | 256.6          | 13.5                         |
| 18       | 18.0         | 0.9               | 78         | 77.9           | 4.1                                       |            | 137.8          | 7.2          | 198                 | 197.7          |       | 258        | 257.6          | 13.5                         |
| 19       | 19.0         | 1.0               | . 79       | 78.9           | 4.1                                       |            | 138.8          | 7.3          | 199                 | 198.7          |       | 259        | 258.6          | 13.6                         |
| 20       | 20.0         | 1.0               | 80         | 79. <b>9</b>   | 4.2                                       | 140        | 139.8          | 7.3          | 200                 | 199.7          | 10:5  | 260        | 259.6          | 13.6                         |
| 21       | 21.0         | 1.1               | 81         | 80.9           | 4.2                                       | 141        | 140.8          | 7.4          | 201                 | 200.7          | 10.5  | 261        | 260.6          | 13.7                         |
| 22       | 22.0         | ì.2               | 82         | 81.9           | 4.3                                       |            | 141.8          | 7.4          | 202                 | 201.7          |       | 262        | 261 6          | 13.7                         |
| 23       | 23.0         | 1.2               | 83         | 82.9           | 4.3                                       |            | 142.8          | 7.5          | 203                 | 202.7          |       | 263        | 262.6          | 13.8                         |
| 24<br>25 | 24.0<br>25.0 | 1.3               | 84<br>85   | 83.9<br>84.9   | 4.4                                       | 144        | 143.8<br>144.8 | 7.6          | 204                 | 203.7<br>204.7 |       | 264<br>265 | 263.6<br>264.6 | 13.8<br>13.9                 |
| 26       | 26.0         | 1.3               | 86         | 85.9           | 4.5                                       |            | 145.8          | 7.6          | 205<br>206          | 205.7          |       | 266        | 265.6          | 13.9                         |
| 27       | 27.0         | 1.4               | 87         | 86.9           | 4.6                                       | 147        | 146.8          | 7.7          | 207                 | 206.7          |       | 267        | 266.6          | 14.0                         |
| 28       | 28.0         | 1.5               | 88         | 87.9           | 4.6                                       | 148        | 147.8          | 7.7          | 208                 | 20,7.7         |       | 268        | 267.6          | 14.0                         |
| 29       | 29.0         | 1.5               | 89         | 88.9           | 4.7                                       | 149        | 148.8          | 7.8          | 209                 | 208 7          |       | 269        | 268.6          | 14.1                         |
| .80      | 30.0         | 1.6               | 90         | 89.9           | 4.7                                       | 150        | 149.8          | 7.9          | 210                 | 209.7          | 11.0  | 270        | 269.6          | 14.1                         |
| 31       | 31.0         | 1.6               | 91         | 90.9           | 4.8                                       |            | 150.8          | 7.9          | 211                 | 210.7          |       |            | 270.6          | 14.2                         |
| 32       | 32.0         | 1.7               | 92         | 91.9           | 4.8                                       |            | 151.8          | 8.0          | 212                 | 211.7          |       | 272        | 271.6          | 14.2                         |
| 33<br>34 | 33.0<br>34.0 | 1.7               | 93<br>94   | 92.9<br>93.9   | 4.9                                       |            | 152.8<br>153.8 | 8.0          | 213                 | 212.7 $213.7$  |       | 273<br>274 | 272.6<br>273.6 | 14.3<br>14.3                 |
| 35       | 35.0         | 1.8               | 95         | 94.9           | <b>5.</b> 0                               |            | 154.8          | 8.1          | 215                 | 214.7          |       | 275        | 274.6          | 14.4                         |
| 36       | 36.0         | 1.9               | - 96       | 95.9           | 5.0                                       | 156        | 155.8          | 8.2          | 216                 | 215.7          |       | 276        | 275.6          | 14.4                         |
| 37       | 36.9         | 1.9               | 97         | 96.9           | 5.1                                       | 157        | 156.8          | 8.2          | 217                 | 216.7          |       |            | 276.6          | 14,5                         |
| 38<br>39 | 37.9         | 2.0               | 98         | 97.9           | 5.1                                       | 158        | 157.8          | 8.3          | 218                 | 217.7          |       | 278        | 277.6          | 14.5                         |
| 40       | 38.9         | 2.0               | 99<br>100  | 98.9<br>99.9   | $\begin{array}{c} 5.2 \\ 5.2 \end{array}$ | 159<br>160 | 158.8<br>159.8 | 8.3<br>8.4   | 219<br>220          | 218.7 $219.7$  |       | 279<br>280 | 278.6<br>279.6 | 14.6<br>14.7                 |
|          |              |                   |            | <u> </u>       |   |            |                |              |                     |                |       |            | <u>'</u> !     |                              |
| 41 42    | 40.9         | $\frac{2.1}{2.2}$ | 101        | 100.9          | 5.3                                       | 161        | 160.8          | 8.4          | 221                 | 220.7          |       | 281        | 280.6          | 14.7<br>14.8                 |
| 43       | 42.9         | 2.2               | 102<br>103 | 101.9 $102.9$  | 5.3<br>5.4                                | 162<br>163 | 161.8<br>162.8 | 8.5<br>8.5   | 222<br>223          | 221.7 $222.7$  | 11.0  | 282<br>283 | 281.6<br>282.6 | 14.8                         |
| 44       | 43.9         | 2.3               | 104        | 103.9          | 5.4                                       | 164        | 163.8          | 8.6          | 224                 | 223.7          |       | 284        | 283.€          | 14.9                         |
| 45       | 44.9         | 2.4               | 105        | 104.9          | 5.5                                       | 165        | 164.8          | 8.6          | 225                 | 224.7          | 11.8  | 285        | 284.6          | 14.9                         |
| 46       | 45.9         | 2.4               | 106        | 105.9          | 5.5                                       | 166        | 165.8          | 8.7          | 226                 | 225.7          |       | 286        | 285.6          | 15.0                         |
| 47 48    | 46.9<br>47.9 | 2.5               | 107<br>108 | 106.9          | 5.6                                       | 167        | 166.8          | 8.7          | 227                 | 226.7          |       | 287        | 286.6<br>287.6 | 15.0<br>15.1                 |
| 49       | 48.9         | 2.5               | 108        | 107.9<br>108.9 | 5.7<br>5.7                                | 168<br>169 | 167.8<br>168.8 | 8.8          | 228<br>229          | 227.7<br>228.7 |       | 288<br>289 | 287.6          | 15.1                         |
| 50       | 49.9         | 2.6               | 110        | 109.8          | 5.8                                       | 170        | 169.8          | 8.9          | 230                 | 229.7          |       | 290        | 289.6          | 15.2                         |
| 51       | 50.9         | 2.7               | 111        | 110.8          | 5.8                                       | 171        | 170.8          | 8.9          | 231                 | 280.7          |       | 291        | 290.6          | 15.2                         |
| 52       | 51.9         |                   |            | 111.8          |   |            | 170.8          |              |                     | 280.7          |       |            | 291.6          |                              |
| 53       | 52.9         | 2.8               |            | 112.8          |   |            | 172.8          |              |                     | 232.7          |       | 293        | 292.6          | 15.3                         |
| 54       | 53.9         | 2.8               | 114        | 113.8          | 6.0                                       | 174        | 173.8          | 9.1          | 234                 | 233.7          | 12.2  | 294        | 293.6          | 15.4                         |
| 55       | 54.9         |                   | 115        | 114.8          |   |            | 174.8          |              | 235                 | 234.7          |       |            | 294.6          | 15.4                         |
| 56<br>57 | 55.9<br>56.9 |                   | 116<br>117 | 115.8<br>116.8 |   |            | 175.8          |              | 236<br>237          | 235.7<br>236.7 |       | 296<br>297 | 295.6<br>266.6 | 15. <b>5</b><br>15. <b>5</b> |
| 58       | 57.9         |                   | 11         | 117.8          |   |            | 176.8<br>177.8 |              |                     | 237.7          |       | 298        | 297.6          |                              |
| 59       | 58.9         |                   |            | 118.8          |   | 179        | 178.8          |              | 239                 | 238.7          |       | 299        | 298.6          |                              |
| 60       | 59.9         |                   |            | 119.8          |   |            | 179.8          |              |                     | 239.7          |       |            | 299.6          |                              |
| Dist.    | Dep.         | DLat              | Dist.      | Dep.           | D.Lat                                     | Dist.      | Dep.           | D.Lat        | Dist.               | Dep.           | D.lat | Dist.      | Dep.           | D. Lat                       |
|          |              |                   |            |                |   |            | . 1            |              |                     | -г             |       |            |                |                              |

97 Dames

4 Degrees. Dist. D.Lat Dep. Dep. D.Lat Dep. Dist. D.Lat Dep Dist. D.Lat Dist. D.Lat Dep: Dist. 16.8 180.6 12.6 241 240.4 1 1.0 0.1 61 60.9 4.3 121 120.7 8.4 181 181.6 12.7 242 241.4 16.9 2 2.0 0.1 62 61.8 4.3 122 121.7 8.5 182 242.4 17.0 3 3.0 0.2 63 62.8 4.4 123 122.7 8.6 183 182.6 12.8 243 243.4 17.0 183.6 12.8 4 64 63.8 4.5 124 8.6 184 244 4.0 0.3 123.7 5 5.0 125 185 184.5 12.9 245 244.4 17.1 0.3 65 64.8 4.5 124.7 8.7 245.4 17.2 в 6.0 0.4 66 65.8 4.6 126 125.7 8.8 186 185.5 13.C 246 246.4 17.9 186.5 13.0 247 7 7.0 0.5 67 66.8 4.7 127 126.7 8.9 187 8.0 247.4 17.3 8 4.7 8.9 188 187.5 13.1 248 68 67.8 128 127.7 0.6 9.0 10.0 4.8 248.4 17.4 9 0.6 69 68.8 129 128.7 9.0 189 188.5 13.2 249 189.5 13.3 250 249.4 17.4 190 10 0.7 70 69.8 4.9 130 129.7 9.1 190.5 13.3 250.4 17,5 71 251 11 11.0 0.8 70.8 5.0 131 191 130.7 12.0 0.8 191.5 13.4 252 251.4 17.6 72 71.8 5.0 132 9.2 192 12 1131.7 252.4 17.6 192.5 13.5 253 13 13.0 0.9 73 72.8 5.1 133 132.7 9.3 193 253.4 17.7 73.8 194 193.5 13.5 254 14 14.0 1.0 74 5.2134 133.7 9.3 17.8 15.0 16.0 17.0 254.4 194.5 13.6 255 15 1.0 75 74.8 5.2 135 134.7 9.4 195 255.4 17.9 16 1.1 76 75.8 5.3 136 135.7 9.5 196 195.5 13.7 256 5.4 256.4 17.9 77 76.8 137 136.7 197 196.5 13.7 257 17 1.2 9.6 257.4 18.0 18 18.0 1.3 78 77.8 5.4 138 137.7 9.6 198 197.5 13 8 258 258.4 18.1 19 19.0 79 78.8 5.5 139 138.7 9.7 199 198.5 13.9 259 1.3 20 20.0 80 79.8 5.6 140 9.8 200 199.5 14.0 260 259.4 18.1 1.4 139.7 21 20.9 81 80.8 140.7 200.5 14.0 261 260.4 18.2 1.5 5.7 141 9.8 901 18.3 261.4 82 81.8 5.7 9.9 201.5 14.1 262 22 21.9 1.5 142 141.7 202 142.7 10.0 202.5 14.2 262.4 18.9 263 23 22.9 1.6 83 82.8 5.8 143 203 84 83.8 5.9 143.6 10.0 204 203.5 14.2 264 263.4 18.4 94 23.9 1.7 144 204.5 14.3 264.4 18.5 85 84.8 5.9 144.6 10.1 205 265 25 24.9 1.7 145 266 265.4 18.6 205.5 14.4 26 25.9 1.8 86 85.8 6.0 146 145.6 10.2 206 266.3 27 87 86.8 6.1 146.6 10.8 207 206.5 14.4 267 18.6 26.9 1.9 147 267.3 18.7 268 28 27.9 2.0 88 87.8 6.1 148 147.6 10.3 203 207.5 14.5 149 148.6 10.4 208.5 14.6 268.3 18.8 88.8 6.2 269 29 28.0 2.0 89 209 269.3 18.8 149.6 10.5 30 29.9 2.1 90 89.8 6.3 150 210 209.5 14.6 270 31 210.5 14.7 271 270.3 18.9 30.9 2.2 91 90.8 6.3 150.6 10.5 211 1.51 272 271.3 19.0 211.5 14.8 32 31.9 2.2 92 91.8 6.4 152 151.6 10.6 212 212. 8 14.9 272.3 19.0 32.9 2.3 92.8 6.5 153 273 33 93 152.6 10.7 213 153.6 10.7 213.5 14.9 274 273.3 19.1 34 33.9 2.4 94 93.8 6.6 154 214 154.6 10.8 214.5 15.0 275 274.3 19.2 35 34.9 2.4 95 94.8 6.6 155 215 155.6 10.9 215.5 15.1 276 275.3 19.3 36 35.9 2.5 96 95.8 6.7 156 216 276.8 19.3 37 97 156.6 11.0 217 216.5 15.1 277 36.9 2.6 96.8 6.8 157 277.3 19.4 278.3 19.5 217.5 15.2 278 38 218 37.9 2.7 98 97.8 6.8 158 157.6 11.0 2.7 158.6 11.1 218.5 15.3 279 39 38.9 99 98.8 159 219 6.9 279.3 19.5 40 39.9 2.8 100 159.6 11.2 220 219.5 15.3 280 99.8 7.0 160 220.5 15.4 280.3 19.6 41 40.9 2.9 101 100.8 160.6 11.2 221 281 7.0 161 161.6 11.3. 42 41.9 2.9 222 221.5 15.5 282 281.3 19.7 102 101.8 7.1 162 42.9 8.0 43 162.6 11.4 223 222.5 15.6 283 282.3 19.7 103 102.7 7.3 163 43.9 3,1 223.5 15.6 284 283.3 19.8 44 104 103.7 164 163.6 11.4 224 7.3 45 104.7 7.3 105.7 7.4 106.7 7.5 164.6 11.5 225 224.5 15.7 285 284.3 19.9 44.9 3,1. 105 165 286 285.3 20.0 165.6 11.6 226 225.4 15.8 40 45,9 3.2 106 166 166.6 11.6 226.4 15.8 287 286.3 20.0 46.9 47.9 47 3.3 107 106.7 7.5 167 227 107.7 227,4 15.9 287.3 20.1 48 167.6 11.7 228 288 108 7.5 168 3.3 289 288.3 20.2 48.9 49 8.4 109 108.7 7.6 169 168.6 11.8 229 228.4 16.0 289.3 20.2 290 5U 169.6 11.9 230 229:4 16.0 49.9 3.5 110 109.7 7.7 170 170.6 11.9 290.3 20.3 50.9 231 230.416.1 29Í 51 3.6 111 110.7 7.7 171 291.3 20.4 232 231.4 16.2 292 52 51.9 3.6 112 111.7 7.8 172 171.6 12.0 292.3 20.4 232.4 16.3 293 53 52.9 3.7 113 112,7 7,9 113,7 8.0 173 172.6 12.1 233 53.9 3.8 20.5 233.4 16.3 293.3 54 114 174 173.6 12.1 234 294 294.3 20.6 55 54.9 3.8 115 114.7 6.0 175 174,6 12.2 235 234.4 16.4 295 296 295.3 20.6 56 8,1 236 235.4 16.5 55.9 3.9 116 115.7176 175.6 12.3 296.3 20.7 57 56.9 4.0 117 8,2 176.6 12.3 237 236.4 16.5 297 116.7 177 297.3 20.8 58 57.9 58.9 4.0 118 117.7 177.6 12.4 238 237.4 16.6 298 8.2 178 **5**9 178.6 12.5 239 238.4 16.7 299 298.3 20.9 119 4.1 118.7 8.3 179 299.3 20.9 60 179.6 12.6 300 59.9 4.2 120 119.7 8.4 180 240 239.4 16.7 Dist. | Dep. |D.Lat | Dist. | Dep. |D.Lat | Dist. | Dep. |D.Lat | Dist. | Dep. |D.Lat Dep. D.Lat

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. TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

| _         |              |            | <u> </u>     |                |            | 5          | Degre          | ees. ·       |            | ······································ |            |                         |              |
|-----------|--------------|------------|--------------|----------------|------------|------------|----------------|--------------|------------|--|------------|-------------------------|--------------|
| Dist.     | D.Lat        | Dep.       | Dist.        | D. Lat         | Dep.       |            |                |              | Dist.      | D.Lat Dep.                             | Dist.      | D.Lat                   | Dep.         |
| 1         | 1.0          | 0.1        | 61           | 60.8           | 5.3        | 121        | 120.5          | 10.5         | 181        | 180.3 15.8                             | 241        | 240.1                   | 21 0         |
| 2         | 2.0          |            | 62           | 61.8           |            | 122        | 121.5          |              | 182        | 181.3 15.9                             | 242        | 241.1                   |              |
| 3         | 3.0          | 0.3        | 63           | 62.8           |            | 123        | 122.5          |              | 183        | 182.3 15.9                             | 243        | 242.1                   | 21.2         |
| 4<br>5    | 4.0          |            | 64           | 63.8           |            | 124        | 123.5          |              | 184        | 183.3 16.0                             |            | 243.1                   | 21.3         |
| 6         | 5.0<br>6.0   | 0.4        | 65<br>66     | 64.8           | 5.7<br>5.8 | 125<br>126 | 124.5<br>125.5 |              | 185<br>186 | 184.3 16.1<br>185.3 16.2               | 245<br>246 | 244.1<br>245.1          | 21.4         |
| 7         | 7.0          |            | 67           | 66.7           |            | 127        | 126.5          |              | 187        | 186.3 16.3                             |            | 246.1                   | 21.5         |
| 8         | 8.0          | 0.7        | 68           | 67.7           |            | 128        | 127.5          |              | 188        | 187.3 16.4                             | 248        | 247.1                   | 21.6         |
| 9         | 9.0          | 0.8        | 69           | 68.7           | 6.0        | 129        | 128.5          |              | 189        | 188.3 16.5                             | 249        | 248.1                   | 21.7         |
| 10        | 10.0         | 0.9        | 70           | 69.7           | 6.1        | 130        | 129.5          | 11.5         | 190        | 189.3 16.6                             | 250        | 249.0                   | 21.8         |
| 11        | 11.0         | 1.0        | 71           | 70.7           | 6.2        | 131        | 130.5          | 11.4         | 191        | 190.3 16.6                             | 251        | 250.0                   | 21.9         |
| 12        | 12.0         |            | 72           | 71.7           | 6.3        | 132        | 131.5          |              | 192        | 191.3 16.7                             | 252        | 251.0                   |              |
| 13        | 13.0         | 1.1        | 73           | 72.7           | 6.4        | 133        | 132.5          | 11.6         | 193        | 192.3 16.8                             | 253        | 252.0                   |              |
| 14        | 13.9         | 1.2        | 74           | 73.7           | 6.4        | 134        | 133.5          |              | 194        | 193.3 16.9                             | 254        | 253.0                   | 22.1         |
| 15        | 14.9         | 1.3        | 75           | 74.7           | 6.5        | 195        | 134.5          |              | 195        | 194.3 17.0                             | 255        | 254.0                   |              |
| 16<br>17  | 15.9<br>16.9 | 1.4        | 77           | 75.7<br>76.7   | 6.6        | 136        | 135.5<br>136.5 |              | 196<br>197 | 195.3 17.1<br>196.3 17.2               | 256<br>267 | 255.0<br>256.0          | 22.3<br>22.4 |
| 18        | 17.9         | 1.6        | 78           | 77.7           | 6.8        | 138        | 137.5          |              | 198        | 197.2 17.3                             | 258        | 257.0                   | 22.5         |
| 19        | 18.9         | 1.7        | 79           | 78.7           | 6.9        | 139        | 138.5          |              | 199        | 198.2 17.3                             | 259        | 258.0                   |              |
| 20        | 19.9         | 1.7        | 80           | 79.7           | 7.0        | 140        | 139.5          |              | 200        | 199.2 17.4                             | 260        | 259.0                   | 22.7         |
| 21        | 20.9         | 1.8        | 81           | 80.7           | 7.1        | 141        | 140.5          | 12.3         | 201        | 200.2 17.5                             | 261        | 260.0                   | 22.7         |
| 22        | 21.9         | 1.9        | 82           | 81.7           | 7.1        | 142        | 141.5          |              | 202        | 201.2 17.6                             | 262        | 261.0                   | 22.7         |
| 23        | 22.9         | 2.0        | 83           | 82.7           | 7.2        | 143        | 142.5          |              | 203        | 202.2 17.7                             | 263        | 262.0                   |              |
| 24        | 23.9         | 2.1        | 84           | 83.7           | 7.3        | 144        | 149.5          |              | 204        | 203.2 17.8                             | 264        | 268.0                   | 23.0         |
| 25        | 24.9         | 2.2        | 85           | 84.7           | 7.4        | 145        | 144.4          |              | 205        | 204.2 17.9                             | 265        | 264.0                   | 23.1         |
| 26        | 25.9         | 2.3        | 86           | 85.7           | 7.5        | 146        | 145.4          | 12.7         | 206        | 205.2 18.0                             | 266        | 265.0                   | 23.2         |
| 27<br>28  | 26.9<br>27.9 | 2.4        | 87<br>88     | 86.7<br>87.7   | 7.6<br>7.7 | 147<br>148 | 146.4<br>147.4 |              | 207<br>208 | 206.2 18.0 207.2 18.1                  | 267<br>268 | 266.0<br>267.0          | 29.3<br>23.4 |
| 29        | 28.9         | 2.4        | 89           | 88.7           | 7.8        | 149        | 148.4          |              | 209        | 208.2 18.2                             | 269        | 268.0                   | 23.4         |
| 30        | 29.9         | 2.6        | 90           | 89.7           | 7.8        | 150        | 149.4          | . ,          | 210        | 209.2 18.3                             | 270        | 269.0                   | 23.5         |
| -01       |              |            |              | 90.7           |            |            |                |              | 011        | 210.218.4                              | 971        |                         |              |
| 31<br>32  | 30.9<br>31.9 | 2.7        | 91<br>92     | 91.6           | 7.9<br>8.0 |            | 150.4<br>151.4 | 13.2<br>13.2 |            | 211.2 18.5                             | 271<br>272 | 270.0<br>271.0          | 23.6<br>23.7 |
| 33        | 32.9         | 2.9        | 93           | 92.6           | 8.1        |            | 152.4          |              |            | 212.2 18.6                             | 273        | 272.0                   | 23.8         |
| 34        | 33.9         | 3.0        | 94           | 93.6           | 8.2        | 154        | 153.4          | 13.4         |            | 213.2 18.7                             | 274        | 278.0                   | 23.9         |
| 35        | 94.9         | 8.1        | 95           | 94.6           | 8.3        | 155        | 154.4          | 13.5         | - 1        | 214.2 18.7                             | 275        | 274.0                   | 24.0         |
| 36        | 35.9         | 3.1        | 96           | 95.6           | 8.4        | 156        | 155.4          | 13.6         |            | 215.2 18.8                             | 276        | 274.9                   | 24.1         |
| 37<br>38  | 36.9         | 3.2        | 97<br>98     | 96.6           | 8.5        | 157<br>158 | 156.4          |              |            | 216.218.9<br>217.219.0                 | 277<br>278 | 275.9                   | 24.1         |
| 39        | 37.9<br>38.9 | 3.3        | 99           | 97.6<br>98.6   | 8.6        | 159        | 157.4<br>158.4 | 13.9         |            | 218.2 19.1                             | 279        | 276.9<br>277.9          | 24.2<br>24.3 |
| 40        | 39.8         | 3.5        | 100          | 99.6           | 8.7        | 160        | 159.4          | 13.9         |            | 219.2 19.2                             | 280        | 278.9                   | 24.4         |
| 41        |              |            |              |                |            |            |                |              |            | 990 9 10 9                             | 001        |                         |              |
| 41<br>42  | 40.8         | 3.6        | 101<br>102   | 100.6<br>101.6 | 8.8<br>8.9 | 161<br>162 | 160.4<br>161.4 | 14.0<br>14.1 | 221<br>222 | 220.2 19.3<br>221.2 19.3               | 281<br>282 | 279.9<br>280.9          | 24.5<br>24.6 |
| 43        | 42.8         | 3.7        |              | 102.6          | 9.0        |            | 162.4          | 14.2         |            | 222.219.4                              | 288        | 281.9                   | 24.7         |
| 44        | 43.8         | 3.8        | 104          | 103.6          | 9.1        |            | 163.4          | 14.3         |            | 223.1 19.5                             | 284        | 282.9                   | 24.8         |
| 45        | 44.8         | 3.9        | 105          | 104.6          | 9.2        | 165        | 164.4          | 14.4         |            | 224.1 19.6                             | 285        | 283.9                   | 24.8         |
| 46        | 45.8         | 4.0        | 106          | 105.6          | 9.2        |            | 165.4          | 14.5         |            | 225.119.7                              |            | 264.9                   | 24.9         |
| 47        | 46.8         | 4.1        | 107          | 106.6          | 9.3        | 167        | 166.4          | 14.6         |            | 226.1 19.8                             | 287        | 285.9                   | 25.0         |
| 48<br>49  | 47.8<br>48.8 | 4.2        | 108 -<br>109 | 107.6<br>108.6 | 9.4        | 168<br>169 | 167.4<br>168.4 | 14.6<br>14.7 |            | 227.1 19.9<br>228.1 20.0               | 288<br>289 | 256.9<br>257.9          | 25.1<br>25.2 |
| 50        | 49.8         | 4.4        | 110          | 109.6          |            | 170        | 169.4          | 14.8         |            | 229.1 20.0                             | 290        | 288.9                   | 25.3<br>25.3 |
|           |              |            |              |                |            |            |                |              |            |  |            | احجنا                   |              |
| 51        | 50.8         | 4.4        |              | 110.6          | 9.7        |            | 170.3          | 14.9         |            | 230.1 20.1 231.1 20.2                  | 291        | 289.9                   | 25.4         |
| 52<br>53  | 51.8<br>52.8 |            |              | 111.6<br>112.6 |            |            | 171.3<br>172.5 | 15.0<br>15.1 |            | 231.120.2                              | 🗢          | 290.9<br>291.9          |              |
| 54        | 53.8         |            |              | 113.6          |            |            | 173.3          |              |            | 233.1 20.4                             |            | 292.9                   |              |
| 55        | 54.8         |            | 115          | 114.6          |            |            | 174.3          | 15.8         |            | 234.1 20.5                             | 295        | 293.9                   | 25.7         |
| 56        | 55.8         | 4.9        |              | 115.6          | 10.1       | 176        | 175.3          | 15.3         | 236        | 235.1 20.6                             | 296        | 294.                    |              |
| 57        | 56.8         | 5.0        | 117          | 116.6          | 10.2       |            | 176.3          | 15.4         |            | 236.1 20.7                             | 297        | 295.9                   | 25.9         |
| 58<br>59  | 57.8         | 5.1        | 118          | 117.6          | 10.3       |            | 177.3          | 15.5         |            | 237.1 20.7                             | 298        | 296.9                   | 26.0         |
| 60        | 58.8<br>59.8 | 5.1<br>5.2 | 119<br>120   | 118.5<br>119.5 |            |            | 178.3<br>179.3 | 15.6<br>15.7 |            | 238.1 20.8<br>239.1 20.9               | 299<br>300 | 297.9<br>2 <b>98</b> .9 | 26.1<br>26.1 |
| <u>  </u> |              |            |              |                |            |            |                |              |            |  |            | <del></del>             |              |
| Dist.     | Dep.         | D.Lat      | Dist.        | Dep.           | D. Lat     | Dist.      | Dep.           | Ď.Lat        | Dist.      | Dep. D.lat                             | Dist.      | Dep.                    | D.Lat        |
| 1         |              |            |              |                |            | Q          | 5 Dam          |              |            | <del></del>                            |            |                         |              |

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

|            |              | IKAV       | ERSE     | IND            |              |            | Degre              |              | OF 1       | THE QUAL                 | KAN        |                  |      |
|------------|--------------|------------|----------|----------------|--------------|------------|--------------------|--------------|------------|--------------------------|------------|------------------|------|
| )ist.      | D.Lat        | Dep.       | Dist.    | DLat           | Dep.         |            | D.Lat              |              | Dist.      | D.Lat Dep.               | Dist.      | D.L.at           | Dep. |
| 1          | 1.0          | 0.1        | 61       | 60.7           | 6.4          | 121        | 120.3              | 12.6         | 181        | 180.0 18.9               | 241        | 239.7            | 25.2 |
| 2          | 2.0          |            | 62       | 61.7           | 6.5          |            | 121.3              | 12.8         |            | 181.0 19.0               |            | 240.7            |      |
| 3          | 3.0          |            | 63       | 62.7           | 6.6          |            | 122.3              | 12.9         |            | 182.0 19.1               | 243        | 241.7            |      |
| 4<br>5     | 4.0<br>5.0   |            | 64<br>65 | 63.6<br>64.6   | 6.7          | 124<br>125 | 123.3<br>124.3     | 13.0<br>13.1 | 184<br>185 | 183.0 19.2<br>184.0 19.3 |            | $242.7 \\ 243.7$ |      |
| 6          | 6.0          | 0.6        | 66       | 65.6           | 6.9          | 126        | 125.3              | 13.2         | 186        | 185.0 19.4               | 246        | 244.7            |      |
| 7          | 7.0          | 0.7        | 67       | 66.6           | 7.0          |            | 126.3              | 13.3         | 187        | 186.0 19.5               |            | 245.6            |      |
| 8          | 8.0          | 0.8        | 68       | 67.6           | 7.1          | 128        | 127.3              | 13.4         | 188        | 187.0 19.7               |            | 246.6            |      |
| 9          | 9.0          | 0.9        | 69       | 68.6           | 7.2          |            | 128.3              | 13.5         | 189        | 188.0 19.8               |            | 247.6            |      |
| 10         | 9.9          | 1.0        | 70       | 69.6           | 7.3          | 130        | 129.3              | 13.6         | 190        | 189.0 19.9               | 250        | 248.6            | 26.1 |
| 11         | 10.9         | 1.1        | 71       | 70.6           | 7.4          |            | 130.3              | 13.7         | 191        | 190.0 20.0               | 251        | 249.6            |      |
| 12         | 11.9         | 1.3        | 72       | 71.6           | 7.5          |            | 131.3              | 13.8         | 192        | 190.9 20.1               | 252        | 250.6            | •    |
| 13         | 12.9<br>13.9 | 1.4        | 73<br>74 | 72.6<br>73.6   | 7.6          |            | 132.3<br>133.3     | 13.9<br>14.0 | 193<br>194 | 191.920.2                |            | 251.6            |      |
| 14<br>15   | 14.9         | 1.6        | 75       | 74.6           | 7.8          |            | 134.8              | 14.1         |            | 193.9 20.4               | 16         | 253.6            |      |
| 16         | 15.9         | 1.7        | 76       | 75.6           | 7.9          |            | 135.3              | 14.2         | 196        | 194.9 20.5               |            | 254.6            |      |
| 17         | 16.9         | 1.8        | 77       | 76.6           | 8.0          | 137        | 136.2              | 14.3         | 197        | 195.9 20.6               | 257        | 255.6            |      |
| 18         | 17.9         | 1.9        | 78       | 77.6           | 8.2          | 138        | 137.2              | 14.4         | 198        | 196.9 20.7               | 258        | 256.6            |      |
| 19         | 18.9         | 2.0        | 79       | 78.6           | 8.3          | 139        | 138.2              | 14.5         | 199        | 197.9 20.8               |            | 257.6            |      |
| 20         | 19.9         | 2.1        | 80       | 79.6           | 8.4          | 140        | 139.2              | 14.6         | 200        | 198.9 20.9               | 260        | 258.6            | 27.2 |
| 21         | 20.9         | 2.2        | 81       | 80.6           | 8.5          | 141        | 140.2              | 14.7         | 201        | 199.921.0                |            | 259.6            |      |
| 22         | 21.9         | 2.3        | 82       | 81.6           | 8.6          |            | 141.2              | 14.8         | 202        | 200.921.1                | 262        | 260.6            |      |
| 23         | 22.9         | 2.4        | 83       | 82.5           | 8.7          | 143        | 142.2              | 14.9         | 203        | 201.921.2                |            | 261.6            |      |
| 24         | 23.9<br>24.9 | 2.5        | 84       | 83.5<br>84.5   | 8.8          |            | 143.2              | 15.1         | 204        | 202.921.3                |            | 262.6            |      |
| 25<br>26   | 25.9         |            | 85<br>86 | 85.5           | 8.9<br>9.0   | 145        | 144.2              | 15.2<br>15.3 | 205<br>206 | 203.9 21.4<br>204.9 21.5 |            | 263.5<br>264.5   |      |
| 27         | 26.9         |            | 87       | 86.5           | 9.1          | 146        | $145.2 \\ 146.2$   |              | 207        | 205.921.6                |            | 265.5            |      |
| 28         | 27.8         | 2.9        | 88       | 87.5           | 9.2          | 148        | 147.2              |              | 208        | 206.9 21.7               | 268        | 266.5            |      |
| 29         | 28.8         | 3.0        | 89       | 88.5           | 9.3          |            | 148.2              | 15.6         | 209        | 207.921.8                | 269        | 267.5            |      |
| 30         | 29.8         | 3.1        | 90       | 89.5           | 9.4          | 150        | 149.2              | 15.7         | 210        | 208.8 22.0               |            | 268.5            |      |
| 31         | 30.8         | 3.2        | 91       | 90.5           | 9.5          | 151        | 150.2              | 15.8         | 211        | 209.8 22.1               | 271        | 269.5            | 28.3 |
| 32         | 31.8         | 3.3        | 92       | 91.5           |              | 152        | 151.2              |              | 212        | 210.8 22.2               | 11         | 270.5            |      |
| 33         | 32.8         | 3.4        | 93       | 92.5           | 9.7          | 153        | 152.2              | 16.0         | 213        | 211.8 22.3               | 273        | 271.5            | 28.5 |
| 34         | 33 8         | 3.6        | 94       | 93.5           |              | 154        | 153.2              |              |            | 212.8 22.4               |            | 272.5            |      |
| 35         | 34.8         | 3.7        | 95       | 94.5           |              | 155        | 154.2              |              | 215        | 213.8 22.5               |            | 273.5            |      |
| 36         | 35.8         |            | 96       |                | 10.0         | 156        | 155.1              | 16.3         | 216        | 214.8 22.6               |            | 274.5            |      |
| 37         | 36.8         | 3.9        | 97       | 96.5           |              | 157        | 156.1              | 16.4         | 217        | 215.8 22.7               |            | 275.5            |      |
| 38<br>39   | 37.8<br>38.8 | 4.0        | 98<br>99 |                | 10.2         | 158        | 157.1<br>158.1     | 16.5<br>16.6 | 218        | 216.8 22.8<br>217.8 22.9 |            | 276.5<br>277.5   |      |
| 40         | 39.8         | 4.2        | 100      |                | 10.3<br>10.5 | 159<br>160 | 159.1              | 16.7         | 219<br>220 | 218.8 23.0               |            | 278.5            |      |
| -          |              | 4.3        |          |                |              | <u> </u>   |                    | !            |            | <u> </u>                 |            |                  | J    |
| 41<br>42   | 40.8<br>41.8 | 4.4        | 101      | 100.4<br>101.4 |              | 161<br>162 | 160 . 1<br>161 . 1 | 16.8<br>16.9 | 221<br>222 | 219.8 23.1<br>220.8 23.2 |            | 279.5<br>280.5   |      |
| 43         | 42.8         | 4.5        | 103      | 102.4          |              | 163        | 162.1              |              | 223        | 221.8 23.9               |            | 281.4            |      |
| 44         | 43.8         | 4.6        | 104      | 103.4          |              | 164        | 163.1              |              | 224        | 222.8 23.4               |            | 282.4            |      |
| 45         | 44.8         | 4.7        | 105      | 104.4          |              | 165        | 164.1              | 17.2         | 225        | 223.8 23.5               |            | 283.4            |      |
| 46         | 45.7         | 4.8        | 106      | 105.4          |              | 166        | 165.1              | 17.4         | 226        | 224.8 23.6               | 286        | 284.4            |      |
| 47         | 46.7         | 4.9        | 107      | 106.4          |              | 167        | 166.1              | 17.5         | 227        | 225.8 23.7               |            | 285.4            |      |
| 48         | 47.7         | 5.0        | 108      | 107.4          |              |            | 167.1              | 17.6         | 228        | 226.8 23.8               |            | 286.4            |      |
| 49<br>50   | 48.7<br>49.7 | 5.1<br>5.2 | 109      | 108.4<br>109.4 |              | 169        | 168.1<br>169.1     | 17.7<br>17.8 | 229        | 227.7 23.9<br>228.7 24.0 |            | 287.4<br>288.4   |      |
|            |              |            |          |                |              | 170        | <u></u>            |              | 230        |                          | ·          |                  |      |
| 51<br>52   | 50.7<br>51.7 | 5.3<br>5.4 | 111      | 110.4          |              |            | 170.1<br>171.1     | 17.9<br>18.0 | 231        | 229.7 24.1<br>230.7 24.3 | 291<br>292 | 289.4<br>290.4   | 80.4 |
| 52<br>53   | 52.7         |            |          | 112.4          |              |            | 172.1              | 18.1         | 232<br>233 | 230.724.3                |            | 290.4            | 30.6 |
| 54         | 59,7         |            |          | 113.4          |              | 174        | 173.0              |              |            | 232.7 24.5               |            | 292.4            |      |
| 55         | 54.7         | 5.7        |          | 114.4          |              | 175        | 174.0              |              |            | 233.7 24.6               |            | 293.4            |      |
| <b>5</b> 6 | 55.7         | 5.9        |          | 115.4          |              | 176        | 175.0              |              | 236        | 294.7 24.7               |            | 294.4            | 30.9 |
| 57         | 56.7         | 6.0        | 117      | 116.4          | 12.3         |            | 176.0              | 18.5         |            | 235.7 24.8               |            | 295.4            | 31.0 |
| 58         | 57.7         |            |          | 117.4          |              | 178        | 177.0              |              | 238        | 236.7 24.9               |            | 296.4            |      |
| 59         | 58.7         |            |          | 118.3          |              | 179        | 178.0              |              | 239        | 237.7 25.0               |            | 297.4            | 31.5 |
| 60         | 59.7         |            |          | 119.3          |              |            | 179.0              |              |            | 238.7 25.1               | L          | 298.4            |      |
| Dist.      | Dep.         | D.Lat      | Dist.    | Dep.           | D.Lat        | Dist.      | Dep.               | D.Lat        | Dist.      | Dep. Dlat                | Dist.      | Dep.             | DLa  |
| 240        | *            |            |          |                |              | 84         | Degre              | ees.         |            |                          |            | viv              |      |

| Dist      | -     |       |        |       |       |        | 7        | Degree     | Pe   | <del></del> |             |       |            | -   |
|--|-------|-------|--------|-------|-------|--------|----------|------------|------|-------------|-------------|-------|------------|-----|
| 2  | Dist  | D.Dat | Dep.   | Dist. | D.Lat | Dep.   | Dist.    | D.Lat      | Dep. | Dist.       | D.Lat Dep.  | Dist. | D. Lat De  | ep. |
| 2   2.0   0.2   66   61.5   7.6   122   131.1   14.9   182   180.6   182.2   242   240.2   29.5     3   5.0   0.4   63   63   65   7.7   132   132.1   15.1   184   183.6   182.3   243   241.2   29.6     4   4.0   0.5   64   63.5   7.8   124   132.1   15.1   184   183.6   182.3   243   241.2   29.5     5   5   5   0.0   65   64   63.5   7.8   124   132.1   15.1   184   183.6   182.3   243   249.2   29.7     6   6   6   0.0   0.7   66   65.5   8.0   126   125.1   15.4   186   184.6   182.7   246   244.2   249.2   29.5     8   7   1.0   0.6   66.5   8.2   137   19.1   15.5   187   185.6   29.8   247.2   29.5     8   7.9   1.0   68   67.5   8.3   128   197.0   15.6   188   186.6   29.2   248.2   29.5     9   8.9   1.2   70   69.5   8.5   130   199.0   15.8   190   188.6   23.2   250   247.1   20.3     10   9.9   1.2   70   69.5   8.5   130   199.0   15.8   190   188.6   23.2   250   247.1   20.3     11   10.9   1.3   71   70.5   8.8   132   131.0   16.0   191   189.6   23.2   250   247.1   20.3     12   11.9   1.6   73   73.5   8.9   133   132.0   16.2   193   194.6   23.4   250.1   250.1   20.7     13   12.9   1.6   73   73.5   8.9   133   132.0   16.2   193   194.6   23.4   250.1   250.1   20.7     14   13.9   1.7   74   73.4   9.0   134   139.0   16.5   194   194.6   23.5   251.1   10.8     15   14.9   1.8   75   74.4   9.1   135   134.0   16.5   195   193.5   23.8   255   251.1   10.8     16   15.9   1.7   74   75.4   9.5   138   137.0   16.5   195   193.5   24.3   255   251.1   13.8     17   19   2.7   76.4   9.4   135   136.0   16.7   197   195.5   24.0   257   251.1   13.1     17   16.9   2.1   77   76.4   9.4   135   136.0   16.7   197   195.5   24.0   257   251.1   13.8     18   17.9   2.2   78   74.4   9.1   135   134.0   16.5   195   193.5   24.3   256   254.1   131.2     19   18.9   2.8      | 1     | 1.0   | 0.1    | 61    | 60.5  | 7.4    | 121      | 120.1      | 14.7 | 181         | 179.7 22.1  | 241   | 239.2 29.  | 4   |
| 4  | 11    |       |        |       |       | 7.6    | 122      |            |      |             |             |       |            |     |
| 5 5.0 0.6 6 65 64.5 7.9 195 194.1 15.2 185 183.692.5 345 248.0 29.0 7 66 6.0 0.7 66 6.5 8.2 197 196.1 15.5 187 185.6 22.8 247 245.2 0.1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 6 6.0 0.7 66 65.5 8.0 126 125.1 15.4 186 184.6 22.7 246 244.9 30.0 87 7 6.9 0.9 67 66.5 8.2 127 195.1 15.5 187 185.6 22.8 247 245.2 25.0 18 8 7.9 1.0 68 67.5 8.3 128 127.0 15.6 188 186.6 22.9 248 247.1 30.3 10 9.9 1.2 70 69.5 8.5 130 129.0 15.6 188 186.6 22.9 248 247.1 30.3 10 9.9 1.2 70 69.5 8.5 130 129.0 15.6 189 186.6 22.9 248 247.1 30.3 11 10.9 1.3 71 70.5 8.7 131 130.0 16.0 191 185.6 22.5 250 248.1 30.5 11 10.9 1.3 71 70.5 8.7 131 130.0 16.0 191 185.6 22.5 250 248.1 30.5 11 12 11.9 1.6 72 71.5 8.8 9 133 139.0 16.1 199 189.6 25.5 250 251.1 30.6 11 12 11.9 1.6 73 79.5 8.9 133 139.0 16.2 193 191.6 20.5 252 250 131.0 15 14.9 1.8 75 74.4 9.1 135 131.0 16.1 199 180.6 25.5 252 251.1 30.8 14 13.9 1.7 74 75.4 9.0 134 135.0 16.5 195 193.5 24.8 255 257.1 31.1 17 16.9 2. 77 76.4 9.4 137 135.0 16.5 195 193.5 24.8 255 257.1 31.1 16 17.9 2.2 78 77.4 9.5 138 137.0 16.8 198 195.5 24.0 257 255.1 31.1 18 17.9 2.2 78 87 74.9 5.1 389 135.0 16.9 199 17.5 24.3 259 256 134.1 31.2 19 18.9 2.3 79 78 4.9 6.6 139 138.0 16.9 199 17.5 24.3 259 257.1 31.4 19 18.9 2.3 79 78 4.9 6.6 139 138.0 16.9 199 17.5 24.3 259 257.1 31.4 252 251 19 18.9 2.4 88 0 79.4 9.7 140 139.0 17.1 200 198.5 24.1 258 256.1 31.4 22 22 22.8 2.8 2.8 3 8.4 10.1 143 141.9 17.4 203 201.5 24.7 263 261.0 32.1 22 22 22.8 2.8 2.8 3 84.4 10.2 144 142.9 17.5 202 200.5 24.6 (32 250.0 31.3 24 252 252 252.3 |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 7 6.9 0.9 67 66.5 8.2 127 196.1 15.5 137 185.6 29.8 247 125.2 \$\can 1.1 69 67.5 8.3 128 127.0 15.6 188 186.6 29.9 248 246.2 \$\can 2.5 10 9.9 1.2 70 69.5 8.5 130 129.0 15.6 188 186.6 29.9 248 246.2 \$\can 2.5 10 9.9 1.2 70 69.5 8.5 130 129.0 15.8 190 188.6 23.0 249 247.1 \$\can 1.0 9.9 1.2 70 69.5 8.5 130 129.0 15.8 190 188.6 23.0 249 247.1 \$\can 1.0 11 10.9 1.3 71 70.5 8.7 131 130.0 16.0 191 88.6 23.0 249 247.1 \$\can 2.5 11 11 10.9 1.5 72 71.5 8.8 132 131.0 16.1 192 190.6 25.4 252 250 130.7 181 129.0 1.6 73 79.5 8.9 133 139.0 16.1 192 190.6 25.4 252 250 130.7 181 129.1 1.6 73 79.5 8.9 133 139.0 16.2 193 191.6 25.5 253 251.1 130.7 181 129.1 1.6 73 74.4 9.0 134 138.0 16.5 194 192.6 23.6 254 252.1 31.0 181 15.9 1.9 76 75.4 9.3 136 135.0 16.5 194 192.6 23.6 254 252.1 31.0 181 15.8 17.9 2.2 78 77.4 9.5 138 137.0 16.5 195 139.5 28.8 255 257.1 31.1 181 17.9 2.2 78 77.4 9.5 138 137.0 16.5 195 139.5 24.0 257 255.1 31.3 181 17.9 2.2 78 77.4 9.5 139 139.0 16.9 199 197.5 24.0 257 255.1 31.3 191 18.9 2.3 79 78.4 9.6 139 138.0 16.9 199 197.5 24.3 259 257.1 31.6 20 19.9 2.4 80 79.4 9.7 140 139.0 17.1 1200 199.5 24.3 259 257.1 31.6 20 19.9 2.4 80 79.4 9.7 140 139.0 17.1 1200 199.5 24.5 260 258.1 31.2 122 21.8 2.7 82 13.4 10.0 142 140.9 17.5 202 200.5 24.6 252 21.3 1.8 22 21.8 2.7 82 13.4 10.0 142 140.9 17.5 202 200.5 24.6 252 25.2 25.2 25.2 25.2 25.2 25.2 25.  |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 8  |       | 6.9   |        |       |       |        |          |            |      |             |             |       |            |     |
| 10   9.9   1.2   70   69.5   8.5   130   199.0   15.8   190   188.6   23.2   250   248.1   30.5     11   10.9   1.3   71   70.5   8.7   131   130.0   16.0   191   189.6   23.5   251   249.1   30.6     12   11.9   1.6   73   71.5   8.8   9   133   132.0   16.9   193   191.6   25.5   253   251.1   30.8     14   13.9   1.7   74   73.4   9.1   135   134.0   16.5   195   193.5   23.6   254   252.131.0     15   14.9   1.8   75   74.4   9.1   135   134.0   16.5   195   193.5   23.6   254   252.131.0     15   14.9   1.8   75   74.4   9.1   135   134.0   16.5   195   193.5   23.6   254   252.131.0     15   14.9   1.8   75   74.4   9.1   135   134.0   16.5   195   193.5   23.6   254   252.131.0     15   14.9   1.8   75   74.4   9.1   135   134.0   16.5   195   193.5   23.6   254   252.131.0     16   15.9   1.9   76   75.4   9.3   136   135.0   16.6   196   194.5   29.9   256   234.1   31.2     17   16.9   2.1   77   76.4   9.4   137   136.0   16.7   197   193.5   24.0   257   255.1   31.4     18   17.9   2.2   78   77.4   9.5   138   137.0   16.8   198   197.5   24.1   258   256.1   31.4     19   18.9   23   79   78.4   9.6   139   138.0   16.9   199   197.5   24.3   259   257.1   31.4     19   18.9   23   79   78.4   9.6   139   138.0   16.9   199   197.5   24.3   259   257.1   31.4     21   20.8   2.6   81   80.4   9.9   141   139.9   17.2   201   198.5   24.5   261   259.1   31.8     22   21.8   2.7   82   31.4   10.0   142   14.9   17.3   200   198.5   24.5   261   259.1   31.8     23   22.8   2.8   83   83.4   10.1   143   141.9   17.3   200   200.5   24.6   262   260.0   32.5     24   23.8   2.9   84   83.4   10.2   144   142.9   17.5   200   200.5   24.6   262   260.0   32.5     25   24.8   8.0   85   84.4   10.4   145   143.9   17.7   205   200.5   24.6   262   260.0   32.5     25   26   25.8   25.8   25.8   25.8   25.8   25.8   25.8   25.8   25.8     27   28   28   28   28   28   28   28  | 16    |       |        |       |       |        |          |            |      |             | 186.6 22.9  |       | 246.2 30.  | .2  |
| 11   10.9   1.3   71   70.5   8.7   131   130.0   16.0   191   189.6   23.3   251   249.1   150.6   131   129.1   1.6   79.2   71.5   8.8   132   131.0   16.1   192   190.6   23.4   252.2   250.1   30.7   141   13.9   1.7   74   73.4   9.0   134   135.0   16.3   194   192.6   23.6   254   252.1   31.0   151   14.9   1.8   75   74.4   9.1   135   134.0   16.3   194   192.6   23.6   254   252.1   31.0   151   14.9   1.8   75   74.4   9.1   135   134.0   16.3   194   192.6   23.6   254   252.1   31.1   151   14.9   1.8   75   74.4   9.1   135   134.0   16.5   195   193.5   23.5   255.1   31.1   171   16.9   2.1   77   76.4   9.4   137   136.0   16.7   197   195.5   23.0   255   257.1   31.1   171   181   171   195.2   22.2   77   76.4   9.4   137   136.0   16.8   198   196.5   294.1   258   256.1   34.4   131   191   18.9   2.3   79   78.4   9.6   139   138.0   16.9   199   197.5   24.3   259   257.1   31.6   250   199.9   197.5   24.3   259   257.1   31.6   250   201   199   2.4   80   79.4   9.7   140   139.0   17.1   200   198.5   24.3   266   258.1   31.4   260   258.1   31.4   252   238.2   2.8    |       |       |        |       | 1 1   |        |          |            |      |             |             | 1     |            |     |
| 12   11.9   1.5   79   71.5   8.8   132   131.0   16.2   193   191.6   23.5   250.1   30.7     14   13.9   1.6   73   72.5   8.9   133   132.0   16.2   193   191.6   23.5   253   251.1   10.8     15   14.9   1.8   75   74.4   9.1   135   134.0   16.3   194   192.6   23.6   234   252.1   31.0     15   14.9   1.8   75   74.4   9.1   135   134.0   16.5   193   193.5   23.8   255   257.1   31.1     16   15.9   1.9   76   75.4   9.3   136   135.0   16.6   195   193.5   23.8   255   257.1   31.1     17   16.9   2.1   77   76.4   9.4   137   136.0   16.7   197   195.5   24.0   257   255.1   31.3     18   17.9   2.2   78   77.4   9.6   139   138.0   16.9   199   197.5   24.0   257   255.1   31.3     19   18.9   2.3   79   78.4   9.6   139   138.0   16.9   199   197.5   24.3   259   257.1   31.6     20   19.9   2.4   80   79.4   9.7   140   139.0   17.1   200   198.5   24.3   266   258.1   31.4     21   20.8   2.6   81   80.4   9.9   141   139.9   17.2   201   199.5   24.5   261   259.1   31.8     22   21.8   2.7   82   31.4   10.0   142   140.9   17.3   202   200.5   24.6   6.72   250.0   31.9     23   22.8   23.8   2.9   84   83.4   10.2   144   44.9   17.5   204   202.5   24.5   266   258.0   32.3     25   24.8   3.0   85   84.4   10.4   145   143.9   17.7   205   203.5   25.0   265   268.0   32.3     26   25.8   3.2   86   85.4   10.5   146   144.9   17.8   206   204.5   25.1   266   264.0   23.4     27   26.8   3.3   87   86.4   10.6   147   145.9   17.9   207   205.5   25.2   267   265.0   32.5     28   27.8   8.3   8.8   91   90.3   11.1   151   149.9   18.4   211   209.4   25.7   271   269.0   33.0     29   28.8   3.5   89   88.3   10.8   149   147.9   18.2   209   204.5   25.7   271   269.0   33.0     30   28   37.7   90.9   91.3   11.2   152   150.9   18.6   212   210.4   25.8   276   266.0   267.0   33.5     31   30.8   3.8   91   90.3   11.1   151   149.9   18.4   211   209.4   25.7   271   269.0   33.0     32   33   32   34   35   34   35   34   35   34   35   34   35   34   35   34   35   34   35   34      | ļ     |       |        | 70    | ·     |        | 130      | 129.0      | 13.8 | 190         | 138.6 23.2  | 250   | !          |     |
| 13   12.9   1.6   73   72.5   8.9   133   193.0   16.2   193   191.6   623.5   253   251.1   130.8   151   14.9   1.8   75   74.4   9.1   135   134.0   16.3   194   192.6   23.6   254   252.1   31.0   151   14.9   1.8   75   74.4   9.1   135   134.0   16.3   195   193.5   23.8   252   252.1   31.0   151   15.9   1.9   1.9   76   75.4   9.3   136   135.0   16.6   196   194.5   23.9   256   254.1   31.1   151   18.0   19.1   19.1   19.2   2.1   77   76.4   9.5   138   137.0   16.8   196   194.5   23.9   256   254.1   131.1   18.1   19.1   19.1   19.2   2.3   79   78.4   9.6   139   138.0   16.9   199   197.5   24.3   259   257.1   131.6   259   257   257.1   131.6   259   257   257.1     |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 14   | .f    |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 15   14.9   1.8   75   74.4   9.1   13.5   134.0   16.5   195   193.5   193.5   23.5   255.1   181.1   17   16.9   2.1   77   76.4   9.4   137   136.0   16.7   197   195.5   24.0   257   255.5   181.3   18   17.9   2.2   78   77.4   9.5   138   137.0   16.8   198   195.5   24.0   227   255.5   181.3   18   17.9   2.2   78   77.4   9.5   139   138.0   16.9   199   197.5   24.0   227   257.1   18.6   20   19.9   2.4   80   79.4   9.7   140   199.0   17.1   200   198.5   24.1   260   255.1   181.7   21   20.8   2.6   81   80.4   9.9   11   139.9   17.1   200   198.5   24.5   261   259.1   181.7   22   218.2   2.7   82   31.4   10.0   142   140.9   17.3   202   200.5   24.6   622   256.0   31.9   23   22.8   2.8   83   82.4   10.1   143   141.9   17.4   203   201.5   24.6   622   260.0   31.9   25   24.8   8.0   85.4   10.2   144   142.9   17.5   204   202.5   24.6   622   260.0   31.9   25   24.8   8.0   8.5   84.4   10.4   145   143.9   17.7   205   203.5   25.0   265   268.0   29.3   25   266   258.3   3.8   86.4   10.6   147   145.9   17.7   205   203.5   25.0   265   268.0   29.3   28.8   27.8   8.8   87.5   10.7   148   146.9   18.0   208   206.4   25.5   267   265.0   22.5   268.2   29.8   88.3   10.8   149   147.9   18.2   209   207.4   25.5   267   265.0   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5   26.5     |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 17   |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 18   |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 19   |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 20   |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 21   20.8   2.6   81   80.4   9.9   141   199.9   17.2   201   199.5   24.5   261   259.1   31.8   22   21.8   2.7   82   31.4   10.0   142   140.9   17.3   202   200.5   24.6   6.92   260.0   31.9   24   23.8   2.8   83   82.4   10.1   143   141.9   17.5   204   202.5   24.9   264   262.0   32.2   25   24.8   3.0   85   84.4   10.4   142.9   17.5   204   202.5   24.9   264   262.0   32.2   26   25.8   3.3   87   86.4   10.6   147   143.9   17.7   205   203.5   25.0   265   266.0   23.2   27   26.8   3.3   87   86.4   10.6   147   145.9   17.9   207   205.5   25.5   265   266.0   23.2   28   27.8   3.4   88   87.3   10.7   148   146.9   18.0   208   206.4   25.3   268   266.0   32.5   29.8   29.8   3.5   89   88.3   10.8   149   147.9   18.2   209   207.4   25.5   269   267.0   32.5   29.8   29.8   3.7   90   89.3   11.0   150   148.9   18.3   210   208.4   25.6   270   268.0   32.7   29.2   31.8   8.9   99   91.3   11.2   152   150.9   18.5   212   210.4   25.6   270   268.0   32.9   23.1   3.8   3.9   29.3   11.5   154.9   18.8   214   212.4   26.1   274   270.0   33.4   35.7   4.4   96   95.3   11.6   155   153.8   19.0   216   214.4   26.1   274   270.0   33.4   35.7   4.5   97   96.3   11.8   157   155.8   19.1   217   215   216.0   216.4   26.6   275   273.0   33.5   36.5   34.7   4.5   97   96.3   11.8   157   155.8   19.1   217   215   216.0   216.4   26.6   275   275.9   2   |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 22 21.8 2.7 82 31.4 10.0 142 140.9 17.3 202 200.5 24.6 262 263 0.0 31.9 24 23.8 2.9 84 83.4 10.1 143 141.9 17.4 203 201.5 24.7 263 261.0 32.1 24 23.8 2.9 84 83.4 10.2 144 142.9 17.5 204 202.5 24.9 264 262.0 32.2 25 24.8 3.0 85 84.4 10.4 145 143.9 17.7 205 203.5 25.0 265 268.0 32.3 26 26 25.8 3.2 86 85.4 10.5 146 144.9 17.8 206 204.5 25.1 266 264.0 32.4 27 26.8 3.3 87 86.4 10.6 147 145.9 17.9 207 205.5 25.2 267 265.0 32.5 28 27.8 3.4 88 87.3 10.7 148 146.9 18.0 208 206.4 25.3 268 266.0 32.7 29 28.8 3.5 89 88.3 10.8 149 147.9 18.2 209 207.4 25.5 269 267.0 32.8 30 29.8 3.7 90 89.3 11.0 150 148.9 18.3 210 208.4 25.6 270 268.0 32.9 31.8 8.9 92 91.3 11.2 152 150.9 18.5 212 210.4 25.8 272 270.033.1 353 32.8 4.0 93 92.3 11.5 152 150.9 18.5 212 210.4 25.8 272 270.033.1 353 32.8 4.0 93 92.3 11.5 154 159.9 18.5 212 210.4 25.8 273 271.0 33.5 35.8 4.0 93 92.3 11.5 154 159.9 18.8 214 211.4 26.0 273 271.0 33.5 35.8 5.7 4.4 96 95.3 11.7 156 154.8 19.0 216 214.4 26.3 276 273 273.9 33.6 35.7 4.6 96 95.3 11.7 156 154.8 19.0 216 214.4 26.3 276 273.9 33.6 35.7 4.6 98 97.3 11.9 158 156.8 19.9 216 214.4 26.3 276 273.9 33.6 35.7 4.8 99 98.7 311.9 158 156.8 19.9 218 217.4 26.7 279 276.9 34.0 39.7 4.9 100 99.3 19.2 160 158.8 19.5 220 218.4 26.6 278 275.9 33.9 9 38.7 4.8 99 98.3 12.1 159 157.8 19.4 219 217.4 26.7 279 276.9 34.0 40 39.7 4.9 100 99.3 19.2 160 168.8 19.5 220 218.4 26.8 280 277.9 34.1 44 44.7 5.5 10 10 10.2 12.3 161 159.8 10.6 158.8 19.5 220 218.4 26.8 280 277.9 34.1 44 44.7 5.5 10 10 10.2 12.3 161 159.8 16.6 8 19.5 220 218.4 26.8 280 277.9 34.0 40 39.7 4.9 100 99.3 19.2 160 168.8 19.5 220 218.4 26.8 280 277.9 34.0 40 39.7 4.9 100 99.3 19.2 160 168.8 19.5 220 218.4 26.8 280 277.9 34.0 40 44.7 5.5 105 104.3 12.8 165.8 19.5 220 218.4 26.9 281 278.9 34.9 44.4 44.7 5.5 10 10 10.2 12.3 161 159.1 167.8 20.7 222 223.3 27.3 284 281.9 34.6 44.7 5.5 105 104.3 12.8 165.8 19.5 220 218.4 26.9 281 278.9 34.9 44.4 44.7 5.5 105 104.3 12.8 165 163.8 20.1 225 223.9 37.7 282 282.9 34.9 34.6 44.7 5.5 105 104.3 12.8 165 163.8 20.1 225 223.9 37.7 | 21    |       |        | -     |       |        |          | <u>'</u> ' |      |             | i           | ٠     |            |     |
| 23   |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 24         23.8         2.9         84         88.3, 4   10.2         144         142.9         17.5         204         202.5   24.9         964         282.0   32.2           25         24.8         3.0         85         84.4   10.5         145         143.9         17.7         205         203.5   25.0         25.0         265         263.0   32.3           26         25.8         3.2         86         85.4   10.6         147         145.9         17.9         207         205.5   25.2         267         265.0   32.5           29         28.8         3.5         89         88.3   10.8         149         147.9         18.0         208         206.4   25.3         268         266.0   32.7         29         28.8         3.7         90         89.3   11.0         150         148.9         18.3         210         208.4   25.6         270         268.0   32.9         267.0   32.8         30         29.8         3.7         90         89.3   11.1         151         149.9         18.4         211         209.4   25.7         271         269.0   32.9         267.0   32.8         30         29.8         3.1.3         155         150.9         18.5         212         210.4   25.6         270 <t< td=""><td>23</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>  | 23    |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 26. 25. 8 3. 2 86 85.4 10.5 146 144.9 17.8 206 204.5 25.1 266 264.0 32.4 27 26.8 3.3 87 86.4 10.6 147 145.9 17.9 207 205.5 25.2 267 265.0 32.5 28 27.8 3.4 88 87.3 10.7 148 146.9 18.0 208 206.4 25.3 268 266.0 32.7 29 28.8 3.5 89 88.3 10.8 149 147.9 18.2 209 207.4 25.5 269 267.0 32.8 30 29.8 3.7 90 89.3 11.0 150 148.9 18.3 210 208.4 25.6 270 228.0 32.9 31 30.8 8.9 92 91.3 11.2 152 150.9 18.4 211 209.4 25.8 272 270.0 33.1 33 32.8 4.0 93 92.3 11.3 153 151.9 18.6 213 211.4 26.0 273 271.0 33.3 32.8 4.0 93 92.3 11.5 154 152.9 18.8 214 212 210.4 25.8 272 270.0 33.1 35 33.7 4.1 94 99.3 11.6 155 154.8 19.0 216 214.4 26.0 273 271.0 33.3 35.8 4.0 93 92.3 11.7 156 154.8 19.0 216 214.4 26.3 275 275 275 233.9 36. 35.7 4.4 96 95.3 11.7 156 154.8 19.0 216 214.4 26.3 275 275 273.0 33.5 36.7 4.5 98 97.3 11.9 156 154.8 19.0 216 214.4 26.3 276 273.9 33.6 35.7 4.6 98 97.3 11.9 158 156.8 19.1 217 215.4 26.4 277 274.9 33.9 38.8 37.7 4.6 98 97.3 11.9 158 156.8 19.3 218 216.4 26.6 278 275.9 33.9 38.7 4.8 99 98.3 12.1 159 157.8 19.4 219 217.4 26.6 278 275.9 33.9 38.7 4.8 99 98.3 12.1 159 157.8 19.4 219 217.4 26.6 278 275.9 33.9 38.7 4.8 99 98.3 12.1 159 157.8 19.4 219 217.4 26.6 278 275.9 33.9 34.0 39.7 4.9 100 99.3 12.2 160 158.8 19.5 220 218.4 26.8 280 277.9 34.1 44 43.7 5.4 104 103.2 12.7 164 162.8 20.0 224 229.3 27.1 282 279.9 34.4 44 43.7 5.5 105 104.9 12.8 165 163.8 20.1 225 229.3 27.1 282 279.9 34.4 44 43.7 5.5 105 104.9 12.8 165 163.8 20.1 225 229.3 27.1 282 279.9 34.4 44 43.7 5.5 105 104.9 12.8 165 163.8 20.1 225 229.3 27.1 282 279.9 34.4 44 43.7 5.5 6 106 105.2 12.9 166 164.8 20.2 226 224.3 27.5 286 283.9 34.9 47 46.6 5.7 107 106.2 13.0 167 165.8 20.4 227 225.3 27.7 287 284.9 35.0 48 47.4 5.5 6 106 105.2 12.9 166 164.8 20.2 227 225.3 27.7 282 282.9 34.9 49 48.6 6.0 109 108.2 13.3 169 167.7 20.6 229 227.3 27.9 289 285.9 35.1 49 48.6 6.0 109 108.2 13.3 169 167.7 20.6 229 227.3 27.9 289 289.8 35.6 55 56.6 6.8 116 115.1 14.1 17.0 17.5 7.1 1.0 23.2 23.3 23.3 28.3 29.2 299.8 35.6 55 55.6 6.6 111 10 109.2 13.4 170 177.7 21.0 232 231.3 |       |       |        |       | 83.4  | 10.2   | 144      |            | 17.5 |             |             |       | 262.0 32.  | .2  |
| 27   |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 28. 27.8 3.4 88 87.3 10.7 148 146.9 18.0 208 206.4 25.3 268 266.0 32.7 29 28.8 3.5 89 88.3 10.8 149 147.9 18.2 209 207.4 25.5 269 267.0 32.8 30 29.8 3.7 90 89.3 11.0 150 148.9 18.3 210 208.4 25.6 270 268.0 32.9 31 30.8 3.8 91 90.3 11.1 151 149.9 18.4 211 209.4 25.7 271 269.0 33.0 32.8 3.8 3.9 92 91.3 11.2 152 150.9 18.5 212 210.4 25.8 272 270.0 33.1 33.7 4.1 94 93.3 11.5 154 152.9 18.8 214 21.4 26.0 273 271.0 33.3 34.7 4.3 95 94.3 11.6 155 153.8 18.9 215 213.4 26.2 275 273.0 33.5 36.7 4.4 96 95.3 11.7 156 154.8 19.0 216 214.4 26.3 276 273.0 33.6 35.7 4.4 96 95.3 11.7 156 154.8 19.0 216 214.4 26.3 276 273.9 35.6 35.7 4.4 96 95.3 11.7 156 154.8 19.0 216 214.4 26.3 276 273.9 35.6 35.7 4.4 96 99.3 11.9 158 156.8 19.3 218 216.4 26.6 278 275.9 33.9 38.8 37.7 4.6 98 97.3 11.9 158 156.8 19.3 218 216.4 26.6 278 275.9 33.8 37.7 4.6 98 97.3 11.9 158 156.8 19.3 218 216.4 26.6 278 275.9 33.8 37.7 4.9 100 99.3 12.2 160 158.8 19.5 220 218.4 26.8 280 277.9 34.1 40.7 5.1 102 101.2 12.4 162 160.8 19.5 220 218.4 26.8 280 277.9 34.1 41 40.7 5.1 102 101.2 12.4 162 160.8 19.7 222 220.3 27.1 282 279.9 34.4 43.7 5.1 102 101.2 12.4 162 160.8 19.7 222 220.3 27.1 282 279.9 34.4 43.7 5.5 105 104.3 12.8 165 163.8 19.7 222 220.3 27.1 282 279.9 34.4 43.7 5.5 105 104.3 12.8 165 163.8 20.1 225.9 223.9 27.1 282 279.9 34.6 45.7 5.6 106 105.2 12.9 166 164.8 20.0 224 222.3 27.3 288 281.9 34.6 45.7 5.6 106 105.2 12.9 166 164.8 20.0 224 222.3 27.3 288 281.9 34.6 45.7 5.6 106 105.2 12.9 166 164.8 20.2 266 224.3 27.5 288 285.9 35.1 46 45.7 5.6 106 105.2 12.9 166 164.8 20.1 222.9 223.2 27.8 282 283.9 37.4 284 241.9 35.0 165.3 20.1 225.9 23.3 27.8 288 285.9 35.0 49.6 6.1 110 100.2 18.4 170 168.7 20.7 230 228.9 28.9 29.9 288.8 35.6 55 54.6 6.8 116 115.1 14.1 176 174.7 21.4 233 231.3 28.4 293 290.8 35.7 54 56.6 6.8 116 115.1 14.1 176 174.7 21.4 233 231.3 28.4 293 290.8 35.7 55 56.6 6.8 116 115.1 14.1 176 174.7 21.4 236 232.9 29.9 288.8 35.5 55 56.6 6.8 116 115.1 14.1 176 174.7 21.4 236 232.9 29.9 292.8 36.8 55.5 55.6 6.8 116 115.1 14.1 176 174.7 21.4 236  |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 99   28.8   3.5   89   88.3   10.8   149   147.9   18.2   209   207.4   25.5   269   267.0   32.8   30   29.8   3.7   90   89.3   11.0   150   148.9   18.3   210   208.4   25.6   270   268.0   32.9   31   30.8   8.9   92   91.3   11.2   152   150.9   18.5   212   210.4   25.8   272   270.0   33.0   32.8   4.0   93   99.3   11.5   154   152.9   18.6   213   211.4   26.0   273   271.0   33.4   33.7   4.1   94   99.3   11.5   154   152.9   18.8   214   212.4   26.0   273   271.0   33.5   34.7   4.3   95   94.3   11.6   155   158.8   18.9   215   213.4   26.2   275   273.0   33.5   36.7   4.4   96   95.3   11.7   156   154.8   19.0   216   214.4   26.3   276   273.9   33.5   36.7   4.5   97   96.3   11.8   157   155.8   19.1   217   215.4   26.4   277   274.9   33.8   37.7   4.6   98   97.3   11.9   158   156.8   19.3   218   216.4   26.6   277   274.9   93.8   38.8   37.7   4.6   98   97.3   11.9   158   156.8   19.3   218   216.4   26.6   277   274.9   93.8   38.8   37.7   4.6   98   99.3   12.2   160   158.8   19.5   220   218.4   26.7   279   276.9   94.0   40   39.7   4.9   100   99.3   12.2   160   158.8   19.5   220   218.4   26.8   280   277.9   94.1   41   40.7   5.0   101   100.2   12.3   161   159.8   19.5   220   218.4   26.8   280   277.9   94.1   42.4   42.7   5.2   103   102.2   12.6   163   161.8   19.9   223   221.3   27.2   282   279.9   94.4   43.7   5.4   104   103.2   12.7   164   162.8   20.0   224   222.3   27.3   284   281.9   94.5   44.7   5.5   105   104.3   12.8   165   163.8   20.1   225   223.3   27.1   282   280.9   94.5   44.7   5.6   106   105.2   12.9   166   164.8   20.2   226   224.3   27.5   286   283.9   94.7   46.6   5.7   107   106.2   13.0   167   165.8   20.4   227   225.3   27.3   284   281.9   94.5   44.6   6.6   5.7   107   106.2   13.0   167   165.8   20.4   227   225.3   27.3   284   281.9   94.5   44.6   6.6   6.6   111   10.0   12.3   111.2   13.6   172   170.7   21.0   232   230.3   28.3   292   287.8   35.5   54.5   56.6   6.3   113   112.2   13.8   170   167.7   20 |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 31  30.8  3.8  91  90.3  11.1  151  149.9  18.4  211  209.4  25.7  271  269.0  33.0  33.3  32.8  4.0  93  92.3  11.5  152  150.9  18.5  212  210.4  25.8  272  270.0  33.1  33  34  33.7  4.1  94  93.3  11.5  154  152.9  18.8  214  212.4  26.0  273  271.0  33.3  34  33.7  4.1  94  93.3  11.5  155  153.8  18.9  215  213.4  26.0  274  272.0  33.4  35.7  4.4  96  95.3  11.7  156  154.8  19.0  216  214.4  26.3  276  273.0  33.5  36.7  4.4  96  95.3  11.7  156  154.8  19.0  216  214.4  26.3  276  273.0  33.5  37  36.7  4.5  97  96.3  11.8  157  155.8  18.9  127  215.4  26.4  277  274.9  33.8  37.7  4.6  98  97.3  11.9  158  156.8  19.3  218  216.4  26.6  278  275.9  33.5  39  38.7  4.8  99  98.3  12.1  159  157.8  19.4  219  217.4  26.7  279  276.9  34.0  39.7  4.9  100  99.3  12.2  160  158.8  19.5  220  218.4  26.8  280  277.9  34.1  44.7  5.0  101  100.2  12.3  161  159.8  19.6  221  219.4  26.9  281  278.9  34.4  43.2  75.2  103  102.2  12.6  163  161.8  19.9  223  221.3  27.2  282  279.9  34.4  44.7  5.5  105  104.3  12.8  165  163.8  19.7  222  220.3  27.1  282  279.9  34.4  44.7  5.5  105  104.3  12.8  165  163.8  20.0  224  222.3  27.3  284  280.9  34.5  44.7  5.5  105  104.3  12.8  165  163.8  20.1  225  223.3  27.7  282  280.9  34.5  44.7  5.6  106  105.2  12.9  166  164.8  20.2  226  224.3  27.8  286  283.9  34.9  47  46.6  5.7  107  106.2  13.0  167  153.8  20.4  227  225.3  27.8  288  285.9  35.1  49  48.6  6.0  109  108.2  13.3  169  167.7  20.6  229  227.3  27.9  299  288.6  83.5  250  49.6  6.1  110  109.2  13.4  170  168.7  20.7  230  228.3  28.0  290  287.8  35.5  54  56.6  6.9  117  118.1  14.1  1.70  173.7  21.0  232  230.3  28.3  292  288.8  35.6  55  54.6  6.7  115  114.1  14.0  175  173.7  21.3  235  235.2  28.6  29.9  288.8  35.6  55  54.6  6.7  115  114.1  14.0  175  173.7  21.3  235  235.2  28.8  296.9  287.8  35.5  54  56.6  6.9  117  116.1  14.3  177  175.7  21.4  236  234.2  28.8  296  299.8  35.6  57  56.6  6.9  117  118.1  14.5  179  177.7  21.8  239  237.2  29.1  299  286.8  6.4  59.6   |       | 28.8  |        |       |       |        |          |            |      |             |             | ı     |            |     |
| 32         31.8         8.9         92         91.3         11.2         152         150.9         18.5         212         210.4         25.8         272         270.0         33.1           33         32.8         4.0         93         92.3         11.3         153         151.9         18.6         213         211.4         26.0         273         271.0         33.3           35         34.7         4.3         95         94.3         11.5         155         155.8         18.9         215         213.4         26.2         275         273.0         33.5           36         35.7         4.4         96         95.3         11.7         156         154.8         19.0         216         214.4         26.3         276         273.9         33.6           37         36.7         4.6         98         97.3         11.9         158         156.8         19.1         217         215.4         26.4         277         273.9         33.6           37         74.6         98         97.3         11.2         159         157.8         19.4         219         217.4         26.2         275.9         33.9           3  | 30    | 29.8  | 3.7    | 90    | 89.3  | 11.0   | 150      | 148.9      | 18.3 | 210         | 208.4 25.6  | 270   | 268.0 32.  | .9  |
| 32   31.8   8.9   92   91.3   11.2   152   150.9   18.5   212   210.4   25.8   272   270.0   33.1   33   32.8   4.0   93   92.3   11.3   153   151.9   18.6   213   211.4   26.0   273   271.0   233.4   35.7   4.1   94   93.5   11.5   154   152.9   18.8   214   212.4   26.1   274   272.0   33.4   35.7   4.4   96   95.3   11.7   156   154.8   19.0   216   214.4   26.3   276   273.9   33.5   35.7   4.4   96   95.3   11.7   156   154.8   19.0   216   214.4   26.3   276   273.9   33.5   35.7   4.4   96   95.3   11.7   156   154.8   19.0   216   214.4   26.3   276   273.9   33.5   35.7   4.6   98   97.3   11.9   158   156.8   19.3   218   216.4   26.6   278   275.9   33.9   38.7   4.8   99   98.3   12.1   159   157.8   19.4   219   217.4   26.7   279   276.9   34.0   40   39.7   4.9   100   99.5   12.2   160   158.8   19.5   220   218.4   26.8   280   277.9   34.1   44   40.7   5.0   101   100.2   12.3   161   159.8   19.6   221   219.4   26.9   281   278.9   34.2   42   41.7   5.1   102   101.2   12.4   162   160.8   19.7   222   20.3   27.1   282   279.9   34.4   43.7   5.4   104   103.2   12.7   164   162.8   20.0   224   222.9   27.3   284   281.9   34.5   44   47.7   5.5   105   104.3   12.8   165   163.8   20.1   225   223.3   27.7   285   280.9   34.5   44   47.6   5.8   108   107.2   13.2   168   164.8   20.2   226   224.8   27.5   286   283.9   34.9   47   46.6   5.7   107   106.2   13.0   167   165.8   20.4   227   225.3   27.7   287   284.9   35.0   49.6   6.1   110   109.2   13.4   170   168.7   20.6   229   227.3   27.7   287   284.9   35.0   49.6   6.1   110   109.2   13.4   170   168.7   20.6   229   227.3   27.9   288   285.9   35.1   49.6   6.6   6.5   113   112.2   13.8   173   171.7   21.0   232   230.3   28.3   292   289.8   35.6   53.5   54.6   6.7   115   114.1   14.0   175   173.7   21.0   232   239.3   28.5   299.8   285.8   35.5   54.6   6.5   115   114.1   14.0   175   173.7   21.0   238   236.2   239.0   238.8   236.0   239.8   36.1   39.6   55.6   6.6   6.7   115   114.1   14.0   175   173. | 31    | 30.8  | 3.8    | 91    | 90.3  | 11.1   | 151      | 149.9      | 18.4 | 211         | 209.425.7   | 271   | 269.0 33.  | .0  |
| 34         35.7         4.1         94         93.3         11.5         154         152.9         18.8         214         212.4         26.1         274         272.0         33.4           35         34.7         4.3         95         94.3         11.6         155         158.8         18.9         215         213.4         26.2         275         273.0         33.6           35.7         4.4         96         95.3         11.7         156         154.8         19.0         216         214.4         26.3         276         273.9         33.6           38         37.7         4.6         98         97.3         11.9         158         156.8         19.3         218         216.4         26.6         278         275.9         33.9           39         38.7         4.8         99         98.3         12.1         159         157.8         19.4         219         217.4         26.7         279         276.9         34.0           41         40.7         5.0         101         100.2         23         21         129.4         26.5         220.3         277.1         282         279.9         34.2   |       |       |        |       |       |        |          | 150.9      | 18.5 | 212         |             |       |            |     |
| 85         34.7         4.3         95         94.3   11.6         155         153.8   18.9   215         213.4   26.2   275         273.0   33.5   34.4   26.9   35.7   4.4   96         95.3   11.7   156   154.8   19.0   216   214.4   26.3   276   273.9   33.6   37.7   4.6   98   97.3   11.9   158   156.8   19.3   218   216.4   26.6   278   275.9   33.9   38.7   4.8   99   98.3   12.1   159   157.8   19.4   219   217.4   26.7   279   276.9   34.0   40   39.7   4.9   100   99.3   12.2   160   158.8   19.5   220   218.4   26.8   280   277.9   34.1   41   40.7   5.0   101   100.2   12.3   161   159.8   19.6   221   219.4   26.9   281   278.9   34.2   41.7   5.1   102   101.2   12.4   162   160.8   19.7   222   220.3   27.1   282   279.9   34.4   43.42.7   5.2   103   102.2   12.6   163   161.8   19.9   223   221.3   27.2   283   280.9   34.5   44.3   42.7   5.5   105   104.3   12.8   165   163.8   20.1   225   223.3   27.4   285   280.9   34.5   44.7   5.5   105   104.3   12.8   165   163.8   20.1   225   223.3   27.4   285   282.9   34.7   46.6   5.7   107   106.2   13.0   167   165.8   20.4   227   225.3   27.7   287   284.9   35.0   49.6   6.1   110   109.2   13.4   170   168.7   20.7   230   228.3   28.0   290   287.8   288.9   35.1   294.6   6.5   113   112.2   13.8   169   167.7   20.6   229   227.3   27.9   239   286.8   35.2   250.6   6.5   113   112.2   13.8   171.7   21.4   233   231.9   284.2   299   288.8   35.5   25.5   56.6   6.5   113   112.2   13.8   173   171.7   21.4   233   231.9   284.2   299   288.8   35.5   285.6   6.6   114   113.2   13.9   174   172.7   21.0   232   230.3   28.3   299   288.8   35.5   25.6   6.6   114   113.2   13.8   171.7   21.4   233   231.9   284.2   299   299.8   35.7   35.6   6.6   6.9   117   116.1   14.3   176   174.7   21.4   233   231.9   284.2   299   299.8   35.6   35.5   35.6   6.6   114   113.2   13.8   177   175.7   21.6   237   235.2   239.2   299.8   295.   |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 36   35.7   4.4   96   95.3   11.7   156   154.8   19.0   216   214.4   26.3   276   273.9   33.6   37.7   4.5   97   96.3   11.8   157   155.8   19.1   217   215.4   26.4   277   274.9   33.8   38.7   4.6   98   97.3   11.9   158   156.8   19.3   218   216.4   26.6   278   275.9   33.9   98.3   21.1   159   157.8   19.4   219   217.4   26.7   279   276.9   34.0   40   39.7   4.9   100   99.3   12.2   160   168.8   19.5   220   218.4   26.8   280   277.9   34.1   41   40.7   5.0   101   100.2   12.3   161   159.8   19.6   221   219.4   26.9   281   278.9   34.2   42.4   1.7   5.1   102   101.2   12.4   162   160.8   19.7   222   220.3   27.1   282   279.9   34.4   43.7   5.4   104   103.2   12.7   164   162.8   20.0   224   222.3   27.3   234   281.9   34.5   44.7   5.5   105   104.3   12.8   165   163.8   20.1   225   223.3   27.4   285   288.9   34.5   44.7   5.5   105   104.3   12.8   165   163.8   20.1   225   223.3   27.4   285   288.9   34.5   48.4   47.6   5.8   108   107.2   13.2   168   166.7   20.5   228   224.8   27.5   236   283.9   34.9   47.4   46.6   5.7   107   106.2   13.0   167   165.8   20.4   227   225.3   27.7   287   284.9   35.0   48.4   47.6   5.8   108   107.2   13.3   169   167.7   20.6   229   227.3   27.9   288   285.9   35.1   49.46   6.0   109.2   13.4   170   168.7   20.7   230   228.3   28.0   290   287.8   35.5   52.5   46.6   6.5   113   112.2   13.8   173   171.7   21.0   232   230.3   28.3   292   288.8   35.5   55.5   54.6   6.6   114   113.2   13.9   174   172.7   21.2   234   232.9   28.5   294   291.8   35.6   55.5   54.6   6.7   115   114.1   14.0   175   173.7   21.3   235   235.2   28.9   296.8   35.6   55.6   6.8   116   115.1   14.1   176   174.7   21.4   236   237   235.2   28.9   297   294.8   36.2   58.6   57.6   7.1   118   117.1   14.4   178   176.7   21.7   21.8   239   237.2   239   238.8   296.8   295.8   36.4   295   296.8   36.4   295   296.8   36.4   295   296.8   36.6   296.8   35.6   36.6   36.6   36.6   36.6   36.6   36.6   36.6   36.6   36.6   36.6   3 |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 37         36.7         4.5         97         96.3         11.8         157         155.8         19.1         217         215.4         26.4         277         274.9         93.8         8         97.3         11.9         158         156.8         19.3         218         216.4         26.6         278         275.9         33.8           39         38.7         4.8         99         98.3         12.1         159         157.8         19.4         219         217.4         26.7         279         276.9         34.0           40         39.7         4.9         100         99.3         12.2         160         168.8         19.5         220         218.4         26.8         280         277.9         34.1           41         40.7         5.0         101         100.2         12.3         161         159.8         19.6         221         219.4         26.9         281         278.9         34.2           42         41.7         5.1         102         101.2         12.3         161         159.8         19.6         221         219.4         26.9         281         278.9         34.2           42         41.7  | - 1   |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 39         38.7         4.8         99         98.3         12.1         159         157.8         19.4         219         217.4         26.7         279         276.9         34.0           40         39.7         4.9         100         99.3         12.2         160         158.8         19.5         220         218.4         26.8         280         277.9         34.1           41         40.7         5.0         101         100.2         12.3         161         159.8         19.6         221         219.4         26.9         281         278.9         34.2           42         41.7         5.1         102         101.2         12.4         162         160.8         19.7         222         220.3         27.1         282         279.9         34.4           43         42.7         5.2         103         102.2         12.6         163         161.8         19.9         223         221.3         27.1         282         279.9         34.5           44         45.7         5.4         104         103.2         12.6         165         163.8         20.1         225         223.3         27.1         285         282.9  |       |       |        | 97    |       |        |          |            |      |             |             |       |            |     |
| 40   |       |       |        |       |       |        |          |            |      |             |             | i     |            |     |
| 41  40.7  5.0  101  100.2  12.3  161  159.8  19.6  221  219.4  26.9  281  278.9  34.2  42  41.7  5.1  102  101.2  12.4  162  160.8  19.7  222  220.3  27.1  282  279.9  34.4  43  42.7  5.2  103  102.2  12.6  163  161.8  19.9  223  221.  27.2  283  280.9  34.5  44  43.7  5.4  104  103.2  12.7  164  162.8  20.0  224  222.3  27.3  284  281.9  34.6  45  44.7  5.5  105  104.3  12.8  165  163.8  20.1  225  223.3  27.3  284  281.9  34.6  45  44.7  5.5  105  104.3  12.8  165  163.8  20.1  225  223.3  27.3  284  281.9  34.6  45  44.7  5.5  106  105.2  12.9  166  164.8  20.2  226  224.3  27.5  286  283.9  34.9  47  46.6  5.7  107  106.2  13.0  167  165.8  20.4  227  225.3  27.7  287  284.9  35.0  48  47.6  5.8  108  107.2  13.2  168  166.7  20.5  228  226.3  27.8  288  285.9  35.1  49  48.6  6.0  109  108.2  13.3  169  167.7  20.6  229  227.3  27.9  239  286.8  35.2  50  49.6  6.1  110  109.2  13.4  170  168.7  20.7  230  228.3  28.0  290  287.8  25.3  50  49.6  6.1  110  109.2  13.4  170  168.7  20.7  230  228.3  28.0  290  287.8  35.3  50  49.6  6.5  113  112.2  13.8  173  171.7  21.0  232  230.3  28.3  292  289.8  35.6  53  52.6  6.5  113  112.2  13.8  173  171.7  21.0  232  230.3  28.5  294  291.8  35.6  55  54.6  6.7  115  114.1  14.0  175  173.7  21.2  234  232.3  28.5  294  291.8  35.8  55  54.6  6.7  115  114.1  14.0  175  173.7  21.2  234  232.3  28.5  294  291.8  35.8  55  54.6  6.7  115  114.1  14.0  175  173.7  21.3  235  235.2  28.6  295  292.8  36.1  57  56.6  6.9  117  116.1  14.3  177  175.7  21.6  237  235.2  28.9  297  294.8  36.2  58  57.6  7.1  118  117.1  14.4  178  176.7  21.7  238  237  238.9  290  298.8  36.1  55  58.6  7.2  119  118.1  14.5  179  177.7  21.8  239  237.2  29.1  299  294.8  36.2  58  57.6  7.1  118  117.1  14.4  178  176.7  21.7  238  237  229.2  29.0  298  295.8  36.3  59  58.6  7.2  119  118.1  14.5  179  177.7  21.8  239  237.2  29.1  299  296.8  36.3  59  58.6  7.2  119  118.1  14.5  179  177.7  21.8  239  237.2  29.1  299  296.8  36.3  59  58.6  7.2  119  118.1  14.5  179  177. |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 42 41.7 5.1 102 101.2 12.4 162 160.8 19.7 222 220.3 27.1 282 279.9 34.4 43 42.7 5.2 103 102.2 12.6 163 161.8 19.9 223 221.3 27.2 283 280.9 34.5 44 43.7 5.5 105 104.3 12.8 165 163.8 20.1 225 223.3 27.4 285 282.9 34.7 46.45.7 5.6 106 105.2 12.9 166 164.8 20.2 226 224.3 27.5 286 283.9 34.9 47 46.6 5.7 107 106.2 13.0 167 165.8 20.4 227 225.3 27.7 287 284.9 35.0 48 47.6 5.8 108 107.2 13.2 168 166.7 20.5 228 226.3 27.8 288 285.9 35.1 49 48.6 6.0 109 108.2 13.3 169 167.7 20.6 229 227.3 27.9 289 286.8 35.2 50 49.6 6.1 110 109.2 13.4 170 168.7 20.7 230 228.3 28.0 290 287.8 35.3 51 50.6 6.2 111 10.2 13.5 171 169.7 20.8 231 229.3 28.2 291 288.8 35.5 52.6 6.5 113 112.2 13.8 173 171.7 21.4 233 231.3 28.4 293 290.8 35.7 54 53.6 6.6 114 115.2 13.9 174 172.7 21.4 233 231.3 28.4 293 290.8 35.7 54 53.6 6.6 114 115.1 14.0 175 173.7 21.4 236 234.9 28.8 296 292.8 38.0 290 287.8 35.8 55 54.6 6.7 115 114.1 14.0 175 173.7 21.4 236 234.9 28.8 296 293.8 36.1 57 56.6 6.9 117 166.1 14.3 177 175.7 21.4 236 234.9 28.8 296 293.8 36.1 57 56.6 6.9 117 161.1 14.5 179 177.7 21.6 237 235.2 28.9 290.2 291.8 35.8 59 58.6 7.2 119 118.1 14.5 179 177.7 21.8 239 257.2 29.1 299 298.8 36.2 58 57.6 7.1 118 117.1 14.4 178 176.7 21.7 21.8 239 257.2 29.1 299 298.8 36.2 58 57.6 7.1 118 117.1 14.4 178 176.7 21.7 21.8 239 257.2 29.1 299 296.8 36.3 59 58.6 7.2 119 118.1 14.5 179 177.7 21.8 239 257.2 29.1 299 296.8 36.6 05 59.6 7.3 120 119.1 14.6 180 178.7 21.9 240 238.2 29.2 300 297.8 36.6 Dist. Dep. DLat Dist. Dep. DLat Dist. Dep. DLat Dist. Dep. DLat   |       |       |        |       | !     |        | <b>}</b> | <b> </b>   |      |             |             |       | .'         |     |
| 43   |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 44 43.7 5.4 104 103.2 12.7 164 162.8 20.0 224 222.3 27.3 284 281.9 34.6 45.7 5.5 105 104.3 12.8 165 163.8 20.1 225 223.3 27.4 285 282.9 34.7 46 45.7 5.6 106 105.2 12.9 166 164.8 20.2 226 224.3 27.5 286 283.9 34.9 47.4 46.6 5.7 107 106.2 13.0 167 165.8 20.4 227 225.3 127.7 287 284.9 35.0 48 47.6 5.8 108 107.2 13.2 168 166.7 20.5 228 226.3 27.8 288 285.9 35.1 49 48.6 6.0 109 108.2 13.3 169 167.7 20.6 229 227.3 127.9 289 286.8 35.5 50 49.6 6.1 110 109.2 13.4 170 168.7 20.7 230 228.3 28.0 290 287.8 35.3 51 50.6 6.2 111 10.2 13.5 171 169.7 20.8 231 229.3 28.2 291 288.8 35.5 52 51.6 6.3 112 111.2 13.6 172 170.7 21.0 232 230.3 28.3 292 289.8 35.6 53 52.6 6.5 113 112.2 13.8 173 171.7 21.4 233 231.3 12.8 29.8 29.8 35.6 55 54.6 6.7 115 114.1 14.0 175 173.7 21.3 235 233.2 28.6 294 291.8 35.8 55 54.6 6.7 115 114.1 14.0 175 173.7 21.3 235 233.2 28.6 295 292.8 36.1 57 56.6 6.9 117 116.1 14.3 177 175.7 21.4 236 234.2 28.8 296 293.8 36.1 57 56.6 6.9 117 116.1 14.3 177 175.7 21.4 236 237 235.2 28.9 297 294.8 36.2 58 57.6 7.1 118 117.1 14.4 178 176.7 21.7 238 239 237.2 28.9 297 294.8 36.2 58 57.6 7.1 118 117.1 14.4 178 176.7 21.7 238 239 237.2 29.1 299 296.8 36.3 59 58.6 7.2 119 118.1 14.5 179 177.7 21.8 239 237.2 29.1 299 296.8 36.4 60 59.6 7.3 120 119.1 14.6 180 178.7 21.9 240 238.2 29.2 300 297.8 36.6 101.1  |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 45 44.7 5.5 105 104.8 12.8 165 168.8 20.1 225 228.3 27.4 225 228.9 34.7 46 45.7 5.6 106 105.2 12.9 166 164.8 20.2 226 224.8 27.5 286 288.9 34.9 47 46.6 5.7 107 106.2 13.0 167 165.8 20.4 227 225.9 27.7 287 284.9 35.0 48 47.6 5.8 108 107.2 13.2 168 166.7 20.5 228 226.3 27.8 288 285.9 35.1 49 48.6 6.0 109 108.2 13.3 169 167.7 20.6 229 227.9 27.9 239 286.8 35.2 50 49.6 6.1 110 109.2 13.4 170 168.7 20.7 230 228.3 28.0 290 287.8 35.3 51 50.6 6.2 111 110.2 13.5 171 169.7 20.8 231 229.3 28.2 291 288.8 35.5 52 51.6 6.3 112 111.2 13.6 172 170.7 21.0 232 230.3 283. 292 289.8 35.6 53 52.6 6.5 113 112.2 13.8 173 171.7 21.4 233 231.3 28.4 298 290.8 35.7 54 53.6 6.6 114 113.2 13.9 174 172.7 21.2 234 232.3 28.5 294 291.8 35.8 55 54.6 6.7 115 114.1 14.0 175 173.7 21.3 235 233.2 28.6 295 292.8 36.1 57 56.6 6.9 117 116.1 14.1 176 174.7 21.4 236 237.2 255.2 28.9 297 294.8 36.1 57 56.6 6.9 117 116.1 14.3 177 175.7 21.6 237 235.2 28.8 296 293.8 36.1 57 58.6 7.2 119 118.1 14.5 179 177.7 21.8 239 237.2 28.9 297 294.8 36.2 58 57.6 7.1 118 117.1 14.4 178 176.7 21.7 23.8 23.9 237.2 29.1 299 296.8 36.3 59 58.6 7.2 119 118.1 14.5 179 177.7 21.8 239 237.2 29.1 299 296.8 36.8 60 59.6 7.3 120 119.1 14.6 180 178.7 21.9 240 238.2 29.2 300 297.8 36.6 EDist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat   |       | 43.7  | 5.4    |       | 103.2 | 12.7   |          |            |      |             | 222.3 27.3  | 284   | 281.9 34.  | .6  |
| 47   |       |       |        |       |       |        |          |            |      |             | 223.3 27.4  | 285   |            |     |
| 48   |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 49         48.6         6.0         109         108.2         13.3         169         167.7         20.6         229         227.3         27.9         239         286.8         35.2           50         49.6         6.1         110         109.2         13.4         170         168.7         20.7         230         228.3         28.0         290         287.8         35.5           51         50.6         6.2         111         110.2         13.5         171         169.7         20.8         231         229.3         28.2         291         288.8         35.5           52         51.6         6.3         112         111.2         13.6         172         170.7         21.0         232         230.3         282.2         291         288.8         35.5           53         52.6         6.5         113         112.2         13.8         173         171.7         21.4         233         231.3         28.4         299         290.8         35.7           54         53.6         6.6         114         113.2         13.9         174         172.7         21.3         235         235.2         28.5         294         291.8  |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 50         49.6         6.1         110         109.2   13.4         170         168.7         20.7         230         228.3   28.0         290         287.8   35.3           51         50.6         6.2         111         110.2   13.5         171         169.7   20.8         231         229.3   28.2         291         288.8   35.5           52         51.6         6.3         112         111.2   13.6         172         170.7         21.0         232         230.3   28.3         292         289.8   35.6           53         52.6         6.5         113         112.2   13.8         173         171.7   21.4         233         231.3   28.4         293         290.8   35.7           54         53.6         6.6         114         113.2   13.9         174         172.7   21.2         234         232.3   28.6         295         291.8   35.6           55         54.6         6.7         115         114.1   14.0         175         173.7   21.3         235         233.2   28.6         295         292.8   36.0           55         54.6         6.8         116         115.1   14.1         176         174.7   21.3         236         234.2   28.8         295         292.8   36.0  |       | 48.6  | 6.0    |       |       |        |          | 167.7      | 20.6 |             |             |       | 286.8 35.  | . 2 |
| 52         51.6         6.3         112         111.2         13.6         172         170.7         21.0         232         230.3         28.3         292         289.8         35.6           53         52.6         6.5         113         112.2         13.8         173         171.7         21.4         233         231.3         28.4         293         290.8         35.7           54         53.6         6.6         114         113.2         13.9         174         172.7         21.2         294         232.3         28.5         294         291.8         35.6           55         54.6         6.7         115         114.1         14.0         175.7         21.3         295         232.2         28.6         295         292.8         36.0           56         55.6         6.8         116         115.1         14.1         176         174.7         21.4         236         234.2         28.8         296         293.8         36.1           57         56.6         6.9         117         116.1         14.3         177         175.7         21.6         237         235.2         28.9         297         294.8         36.2  | 50    | 49.6  | 6.1    | 110   | 109.2 | 13.4   | 170      | 168.7      | 20.7 | 230         |             | 290   | 287.8 35.  | .3  |
| 52         51.6         6.3         112         111.2         13.6         172         170.7         21.0         232         230.3         28.3         292         289.8         35.6           53         52.6         6.5         113         112.2         13.8         173         171.7         21.4         233         231.3         28.4         293         290.8         35.5           54         53.6         6.6         114         113.2         13.9         174         172.7         21.2         234         232.3         28.5         294         291.8         35.5           55         54.6         6.7         115         114.1         14.0         175.7         21.3         235         233.2         28.6         295         292.8         36.0           56         55.6         6.8         116         115.1         14.1         176         174.7         21.4         236         234.2         28.8         296         293.8         36.1           57         56.6         6.9         117         116.1         14.3         177         175.7         21.6         237         235.2         28.9         297         294.8         36.2  |       | 50.6  | 6.2    | 111   | 110.2 | 13.5   | 171      | 169.7      | 20.8 | 231         | 229.3 28.2  | 291   |            |     |
| 54         58.6         6.6         114         113.2         13.9         174         172.7         21.2         294         232.3         28.5         294         291.8         35.8           55         54.6         6.7         115         114.1         14.0         175         173.7         21.3         235         238.2         28.6         295         292.8         36.1           56         55.6         6.8         116         115.1         14.1         176         174.7         21.4         236         234.2         28.8         296         293.8         36.1           57         56.6         6.9         117         116.1         14.3         177         175.7         21.6         237         235.2         228.9         297         294.8         36.2           58         57.6         7.1         118         117.1         14.4         178         176.7         21.7         238         236.2         29.0         298         295.8         36.3           59         58.6         7.2         119         118.1         14.5         179         177.7         21.8         239         237.2         29.1         299         296.8  |       | 51.6  | 6.3    | 112   | 111.2 | 13.6   | 172      | 170.7      | 21.0 | 232         | 230.3 28.3  | 292   |            |     |
| 55 54.6 6.7 115 114.1 14.0 175 173.7 21.3 295 233.2 28.6 295 299.8 36.0 56 55.6 6.8 116 115.1 14.1 176 174.7 21.4 236 234.2 28.8 296 299.8 36.1 57 56.6 6.9 117 116.1 14.3 177 175.7 21.6 237 235.2 28.9 297 294.8 36.1 177 118.1 117.1 14.4 178 176.7 21.7 238 236.2 29.0 298 295.8 36.3 59 58.6 7.2 119 118.1 14.5 179 177.7 21.8 239 237.2 29.1 299 296.8 36.4 60 59.6 7.3 120 119.1 14.6 180 178.7 21.9 240 238.2 29.2 300 297.8 36.6 Dist. Dep. D.Lat   |       | 52.6  |        |       |       |        |          |            |      |             |             |       |            |     |
| 56 55.6 6.8 116 115.1 14.1 176 174.7 21.4 236 234.2 28.8 296 299.8 36.1 57 56.6 6.9 117 116.1 14.3 177 175.7 21.6 237 235.2 28.9 297 294.8 36.2 58 57.6 7.1 118 117.1 14.4 178 176.7 21.7 238 236.2 29.0 298 295.8 36.3 59 58.6 7.2 119 118.1 14.5 179 177.7 21.8 299 257.2 29.1 299 296.8 36.4 60 59.6 7.3 120 119.1 14.6 180 178.7 21.9 240 238.2 29.2 300 297.8 36.6 Dist. Dep. D.Lat  |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 57         56.6         6.9         117         116.1         14.3         177         175.7         21.6         237         235.2         28.9         297         294.8         36.2           58         57.6         7.1         118         117.1         14.4         178         176.7         21.7         238         236.2         29.0         298         295.8         36.3           59         58.6         7.2         119         118.1         14.5         179         177.7         21.8         239         237.2         29.1         299         296.8         36.4           60         59.6         7.3         120         119.1         14.6         180         178.7         21.9         240         238.2         29.2         300         297.8         36.6           Dist.         Dep.         D.Lat         Dist.         Dep.         D.Lat         Dist.         Dep.         D.Lat   |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
| 58   57.6   7.1   118   117.1   14.4   178   176.7   21.7   238   236.2   29.0   238   295.8   36.4   59   58.6   7.2   119   118.1   14.5   179   177.7   21.8   239   237.2   29.1   60   59.6   7.3   120   119.1   14.6   180   178.7   21.9   240   238.2   29.2   60   59.6   7.5   120   119.1   14.6   180   178.7   21.9   60   59.6   7.5   120   131.1   14.6   180   178.7   19.1   60   60   60   60   60   60   60   60  |       | 56.6  | 6.9    | 117   | 116.1 | 14.8   |          |            | 21.6 |             | 235.2 28.9  | 297   | 294.8 36.  | .2  |
| 60 59.6 7.3 120 119.1 14.6 180 178.7 21.9 240 238.2 29.2 300 297.8 36.6 Dist. Dep. D.Lat   |       |       |        |       |       |        |          |            |      |             | 236.2 29.0  |       |            |     |
| Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat  |       |       |        |       |       |        |          |            |      |             |             |       |            |     |
|  |       |       |        |       | -  —' |        | ·        |            |      | '           |             |       |            | -   |
| 83 Degrees.  | UIST. | nep.  | n Trat | Dist. | neb'  | D.L.at |          |            |      | Dist.       | Dep.  D.lat | Dist. | I neb. In. |     |
|  |       |       |        |       |       |        | 83       | Degr       | ees. |             |             | 7.    |            | _   |

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

|           |              |            |           |                | ·            | 8          | Degree         | 78.          |            | <del></del>              |            |                          |
|-----------|--------------|------------|-----------|----------------|--------------|------------|----------------|--------------|------------|--------------------------|------------|--------------------------|
| Dist      | D.Lat        | Dep.       | Dist.     | D.Lat          | Dep.         |            | DLat           |              | Dist.      | D.Lat Dep.               | Dist.      | D.Lat Dep.               |
| 1         | 1.0          | 0.1        | 61        | 60.4           | 8.5          | 121        | 119.8          | 16.8         | .181       | 179.2 25.2               | 241        | 238.733.5                |
| 2         | 2.0          |            | 62        | 61.4           | 8.6          | 122        | 120.8          | 17.0         |            | 180.2 25.3               | 242        | 239.633.7                |
| 8         | 3.0          | 0.4        | 63        | 62.4           | 8.8          | 123        | 121.8          | 17.1         | 183        | 181.2 25.5               | 243        | 240.633.8                |
| 4         | 4.0          | 0.6        | 64        | 63.4           | 8.9          | 124        | 122.8          | 17.3         | 184        | 182.2 25.6               |            | 241.634.0                |
| 5         | 5.0          | 0.7.       | 65        | 64.4           | 9.0          | 125        | 123.8          | 17.4         | 185        | 183.2 25.7               |            | 242.634.1                |
| 6         | 5.9          | 0.8        | 66        | 65.4           | 9.2          | 126        | 124.8          | 17.5         | 186        | 184.2 25.9               |            | 243.634.2                |
| 7         | 6.9<br>7.9   | 1.0        | 67        | 66.3<br>67.3   | 9.3          | 127        | 125.8          | 17.7         | 187        | 185.2 26.0               |            | 244.634.4<br>245.634.5   |
| 9         | 8.9          | 1.1        | 68<br>69  | 68.3           | 9.5<br>9.6   | 128        | 126.8<br>127.7 | 17.8<br>18.0 | 188<br>189 | 186.2 26.2<br>187.2 26.3 | 248<br>249 | 246.634.7                |
| 10        | 9.9          | 1.4        | 70        | 69.3           | 9.7          | 130        | 128.7          | 18.1         | 190        | 188.2 26.4               |            | 247.6 34.8               |
|           |              |            | <b></b>   |                |              |            |                |              |            |                          |            | <del> </del>             |
| 11        | 10.9         | 1.5        | 71        | 70.3           | 9.9          | 131        | 129.7          |              | 191        | 189.1 26.6               | 251        | 248.634.9                |
| 12        | 11.9         | 1.7        | 72        | 71.3           | 10.0         | 132        | 130.7          | 18.4         | 192        | 190.126.7                |            | 249.535.1                |
| 13<br>14  | 12.9         |            | 73        | 72.3           | 10.2         | 133        | 131.7          | 18.5         | 193        | 191.126.9                |            | 250.535.2                |
| 15        | 13.9<br>14.9 | 1.9<br>2.1 | 74<br>75  | 73.3<br>74.3   | 10.3         |            | 182.7          | 18.6         | 194        | 192.1 27.0<br>193.1 27.1 | 254        | 251.5 35.3<br>252.5 35.5 |
| 16        | 15.8         | 2.1        | 76        | 75.3           | 10.4         | 135<br>136 | 133.7<br>134.7 | 18.8         | 195        | 194.1 27.3               | 255<br>256 | 253.535 6                |
| 17        | 16.8         | 2.4        | 77        | 76.3           | 10.6         | 137        | 135.7          | 18.9<br>19.1 | 197        | 195.1 27.4               | 257        | 254.5 35.8               |
| 18        | 17.8         | 2.5        | 78        | 77.2           | 10.9         | 138        | 136.7          | 19.2         | 198        | 196.1 27.6               | 258        | 255.535.9                |
| 19        | 18.8         | 2.6        | 79        | 78.2           | 11.0         | 139        | 137.7          | 19.3         | 199        | 197.1 27.7               | 259        | 256.536.0                |
| 20        | 19.8         | 2.8        | 80        | 79.2           | 11.1         | 140        | 138.6          | 19.5         | 200        | 198.1 27.8               | 260        | 257.5 36.2               |
| 21        | 20.3         |            | 07        | 90.0           |              | 1.43       | 100 6          |              | 001        | 199.0 28.0               | 061        | 258.5 36.3               |
| 22        | 21.8         | 2.9<br>3.1 | 81        | 80.2<br>81.2   | 11.3         | 141        | 139.6<br>140.6 | 19.6         | 201<br>202 | 200.0 28.1               | 261<br>262 | 259.536.5                |
| 23        | 22.8         |            | <b>82</b> | 82.2           | 11.4<br>11.6 | 142        | 141.6          | 19.8<br>19.9 | 203        | 201 0 28.3               | 263        | 260.436.6                |
| 24        | 23.8         | 3.3        | 84        | 83.2           | 11.7         |            | 142.6          | 20.0         | 203        | 202.028.4                | 264        | 261.436.7                |
| 25        | 24.8         | 3.5        | 85        | 84.2           | 11.8         | 145        | 143.6          | 20.2         | 205        | 203.0 28.5               | 265        | 262.436.9                |
| 26        | 25.7         | 3.6        | 86        | 85.2           | 12.0         |            | 144.6          | 20.3         | 206        | 204.0 28.7               | 266        | 263.437.0                |
| 27        | 26.7         | 3.8        | 87        | 86.2           | 12.1         |            | 145.6          | 20.5         | 207        | 205.0 28.8               | 267        | 264.437.2                |
| 28        | 27.7         | 3.9        | 88        | 87.1           | 12.2         | 148        | 146.6          | 20.6         | 208        | 206.0 28.9               | 268        | 265.4 37.3               |
| 29        | 28.7         | 4.0        | 89        | 88.1           | 12.4         |            | 147.5          | 20.7         |            | 207.0 29.1               | 269        | 266.437.4                |
| 30        | 29.7         | 4.2        | 90        | 89.1           | 12.5         | 150        | 148.5          | 20.9         | 210        | 208.0 29.2               | 270        | 267.437.6                |
| 31        | 30.7         | 4.3        | 91        | 90.1           | 12 7         | 151        | 149.5          | 21.0         | 211        | 208.9 29.4               | 271        | 268.4 37.7               |
| 32        | 31.7         | 4.5        | 92        | 91.1           | 12.8         |            | 150.5          | 21.2         | 212        | 209.9 29.5               | 272        | 269.437.9                |
| 33        | 32.7         | 4.6        | 93        | 92.1           | 12.9         | 153        | 151.5          | 21.3         | 213        | 210.9 29.6               | 273        | 270.3 38.0               |
| 34        | 33.7         | 4.7        | 94        | 93 1           | 13.1         | 154        | 152.5          | 21.4         | 214        | 211.9 29.8               | 274        | 271.3 38.1               |
| 35        | 34.7         | 4.9        | 95        | 94.1           | 13 2         | 155        | 153.5          | 21.6         | 215        | 212.9 29.9               | 275        | 272.3 38.3               |
| 36        | 35.6         | 5.0        | 96        | 95.1           | 13.4         | 156        | 154.5          | 21.7         |            | 213.9 30.1               | 276        | 273.338.4                |
| 37<br>38  | 36.6<br>37.6 | 5.1        | 97        | 96.1           | 13.5         | 157        | 155.5          | 21.9         | 217        | 214.9 30.2<br>215.9 30.3 | 277<br>278 | 274.3 38.6<br>275.3 38.7 |
| 39        | 38.6         | 5.3<br>5.4 | 99        | 97.0<br>98.0   | 13.6<br>13.8 | 158<br>159 | 156.5<br>157.5 | 22.0<br>22.1 | 218<br>219 | 216.9 30.5               | 279        | 276.3 38.8               |
| 40        | 39.6         | 5.6        | 100       | 99.0           | 13.9         | 160        | 158.4          | 22.1         | 220        | 217.9 30.6               | 280        | 277.339.0                |
|           |              |            |           |                |              |            |                |              |            |                          | <u> </u>   |                          |
| 41        | 40.6         | 5.7        | 101       | 100.0          | 14.1         | 161        | 159.4          | 22.4         | 221        | 218.8 30.8               | 281        | 278.3 39.1               |
| 42        | 41.6         | 5.8        | 102       | 101.0          | 14.2         | 162        | 160.4          | 22.5         | 222        | 219.8 30.9               | 282        | 279.339.2<br>280.239.4   |
| 44        | 42.6<br>43.6 | 6.0        | 103       | 102.0<br>103.0 | 14.3         | 163<br>164 | 161.4<br>162.4 | 22.7<br>22.8 | 223<br>224 | 220.831.0<br>221.831.2   | 283<br>284 | 281.239.5                |
| 45        | 44.6         | 6.3        | 105       | 104.0          | 14.6         | 165        | 163.4          | 23.0         | 225        | 222.831.3                | 285        | 282.239.7                |
| 46        | 45.6         | 6.4        | 106       | 105 0          | 14.8         | 166        | 164.4          | 23.1         | 226        | 223.8 31.5               | 286        | 283.239.8                |
| 47        | 46.5         | 6.5        | 107       | 106.0          | 14.9         | 167        | 165.4          | 23.2         | 227        | 224.8 31.6               | 287        | 284.239.9                |
| 48        | 47.5         | 6.7        | 108       | 106.9          | 15.0         | 168        | 166.4          | 23.4         | 228        | 225.8 31.7               | 288        | 285.2 40.1               |
| 49        | 48.5         | 6.8        | 109       | 107.9          | 15.2         | 169        | 167.4          | 23.5         | 229        | 226.8 31.9               | 289        | 286.2 40.9               |
| 50        | 49.5         | 7.0        | 110       | 108.9          | 15.3         | 170        | 168.3          | 23.7         | 230        | 227.8 32.0               | 290        | 287.2 40.4               |
| 51        | 50.5         | 7.1        | 111       | 109.9          | 15.4         | 171        | 169.3          | 23.8         | 231        | 228.8 32.1               | 291        | 288 2 40.5               |
| 52        | 51.5         |            |           | 110.9          |              |            | 170.3          |              |            | 229.7 32.3               |            | 289.2 40.6               |
| 53        | 52.5         |            |           | 111.9          | 15.7         | 179        | 171.3          | 24.1         |            | 230.732.4                | 293        | 290.1 40.8               |
| 54        | 53.5         |            |           | 112.9          | 15.9         |            | 172.3          | 24.2         |            | 231.7 32.6               | 294        | 291.140.9                |
| 55        | 54.5         | 7.7        | 115       | 113.9          | 16.0         | 175        | 173.3          |              | 235        | 232.7 32.7               | 295        | 292.141.1                |
| 56        | 55.5         |            |           | 114.9          | 16.1         | 176        | 174.3          | 24.5         | 236        | 233.7 32.8               |            | 293.141.2                |
| 57        | 56.4         |            | 1         | 115.9          | 16.3         | 177        | 175.3          | 24.6         |            | 234.7 33.0               |            | 294.1 41.3               |
| 58<br>50  | 57.4         |            |           | 116.9          | 16.4         | 178        | 176.3          | 24.8         | 238        | 235.7 33.1               |            | 295.141.5                |
| ,59<br>60 | 58.4         |            |           | 117.8          | 16.6         | 179        | 177.3          | 24.9         | 239        | 236.7 33.3               | 299        | 296.141.6<br>297.141.8   |
|           | 59.4         |            |           | 118.8          |              | 180        | 178.2          | 25.1         | 240        | 237.7 83.4               | 300        |                          |
| Dist.     | Dep.         | D.Lat      | Dist.     | Dep.           | D.Lat        | Dist.      | Dep.           | D.Lat        | Dist.      | Dep. D.lat               | Dist.      | Dep. D.Lat               |
|           |              |            |           |                |              |            | 2 Degr         |              |            |                          |            |                          |
|           |              |            |           |                |              | ٥.         |                |              |            |                          |            |                          |

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

| <b>!</b>   |  |  |  |  |  | 9  | Degree   | 25.  |  | <del></del>   | <del>-</del>   |   |  |  |
|--|--|--|--|--|--|--|--|--|--|---|--|---|--|--|
| Dist.  | D.Lat  | Dep.   | Dist.  | D.Lat  | Dep.   |  |  |  | Dist.  | D.Lat   | Dep.   | Dist.   | D.Lat  | Dep.   |
| 1<br>2<br>3<br>4   | 1.0<br>2.0<br>3.0<br>4.0   | 0.2<br>0.3<br>0.5<br>0.6                             | 61<br>62<br>63<br>64                                     | 60.2<br>61.2<br>62.2<br>63.2   | 9.5<br>9.7<br>9.9<br>10.0  | 121<br>122<br>123<br>124   | 119.5<br>120.5<br>121.5<br>122.5   | $19.1 \\ 19.2$   | 181<br>182<br>183<br>184   | 178.8<br>179.8<br>180.7<br>181.7  | 28.3<br>28.5<br>28.6<br>28.8   | 242<br>243  | 238.0<br>239.0<br>240.0<br>241.0   | 37.9<br>38.0   |
| 5<br>6<br>7<br>8   | 4.9<br>5.9<br>6.9<br>7.9   | 0.8<br>0.9<br>1.1<br>1.3                             | 65<br>66<br>67<br>68                                     | 64.2<br>65.2<br>66.2<br>67.2   | 10.2<br>10.3<br>10.5<br>10.6   | 125<br>126<br>127<br>128   | 123.5<br>124.4<br>125.4<br>126.4   | 19.6<br>19.7<br>19.9   | 185<br>186<br>187<br>188   | 182.7<br>183.7<br>184.7<br>185.7  | 28.9<br>29.1<br>29.3<br>29.4   | 245<br>246<br>247   | 242.0<br>243.0<br>244.0<br>244.9   | 38.5<br>38.5<br>38.6   |
| 9<br>10  | 8.9<br>9.9   | 1.4  | 69<br>70   | 68.2<br>69.1   | 10.8<br>11.0   | 129<br>130   | 127.4<br>128.4   | 20.2<br>20.3   | 189<br>190   | 186.7<br>187.7  | 29.6<br>29.7   | 249<br>250  | 245.9<br>246.9   | 39.0<br>39.1   |
| 11<br>12<br>13<br>14<br>15<br>16<br>17                   | 10.9<br>11.9<br>12.8<br>13.8<br>14.8<br>15.8<br>16.8                 | 1.7<br>1.9<br>2.0<br>2.2<br>2.3<br>2.5<br>2.7<br>2.8 | 71<br>72<br>73<br>74<br>75<br>76<br>77<br>78             | 70.1<br>71.1<br>72.1<br>73.1<br>74.1<br>75.1<br>76.1<br>77.0         |  | 134<br>135<br>136<br>137<br>138                                    | 129.4<br>130.4<br>131.4<br>132.4<br>133.3<br>134.3<br>135.3                            | 20.6<br>20.8<br>21.0<br>21.1<br>21.3<br>21.4<br>21.6                 | 191<br>192<br>193<br>194<br>195<br>196<br>197<br>198               | 188.6<br>189.6<br>190.6<br>191.6<br>192.6<br>193.6<br>194.6                   | 30.2<br>30.3<br>30.5<br>30.7<br>30.8<br>31.0                         | 252<br>253<br>254<br>255<br>256<br>257<br>258               | 247.9<br>248.9<br>249.9<br>250.9<br>251.9<br>252.8<br>253.8<br>254.8                   | 39.4<br>39.6<br>39.7<br>39.9<br>40.0<br>40.2                         |
| 19<br>20   | 18.8<br>19.8   |  | 79<br>80   | 78.0<br>79.0   | 12.5   | 139<br>140   | 137.3<br>138.3   | 21.9   | 199<br>200   | 196.5<br>197.5  | 31.1<br>31.3   | 259<br>260  | 255.8<br>256.8   | 40.7   |
| 21<br>22<br>23<br>24<br>25<br>26<br>27<br>28<br>29       | 20.7<br>21.7<br>22.7<br>23.7<br>24.7<br>25.7<br>26.7<br>27.7<br>28.6 | 3.5<br>3.6<br>3.8<br>3.9<br>4.1<br>4.2<br>4.5        | 81<br>82<br>83<br>84<br>85<br>86<br>87<br>88<br>89       | 80.0<br>81.0<br>82.0<br>83.0<br>84.0<br>84.9<br>85.9<br>86.9         | 13.0<br>13.1<br>13.3<br>13.5<br>13.6<br>13.8<br>13.9                 | 147<br>148<br>149  | 139.3<br>140.3<br>141.2<br>142.2<br>143.2<br>144.2<br>145.2<br>146.2                   | 22.2<br>22.4<br>22.5<br>22.7<br>22.8<br>23.0<br>23.2<br>23.3         | 201<br>202<br>203<br>204<br>205<br>206<br>207<br>208<br>209        | 198.5<br>199.5<br>200.5<br>201.5<br>202.5<br>203.5<br>204.5<br>205.4<br>206.4 | 32.4<br>32.5<br>32.7   | 262<br>263<br>264<br>265<br>266<br>267<br>268<br>269        | 257.8<br>258.8<br>259.8<br>260.7<br>261.7<br>262.7<br>263.7<br>264.7<br>265.7          | 41.0<br>41.1<br>41.3<br>41.5<br>41.6<br>41.8<br>41.9                 |
| 30<br>31<br>32<br>33<br>34<br>35<br>36<br>37<br>38<br>39 | 29.6<br>31.6<br>32.6<br>33.6<br>34.6<br>35.6<br>36.5<br>37.5<br>38.5 | 5.5<br>5.6<br>5.8<br>5.9<br>6.1                      | 90<br>91<br>92<br>93<br>94<br>95<br>96<br>97<br>98<br>99 | 88.9<br>90.9<br>91.9<br>92.8<br>93.8<br>94.8<br>95.8<br>96.8<br>97.8 | 14.1<br>14.2<br>14.4<br>14.5<br>14.7<br>14.9<br>15.0<br>15.2<br>15.3 | 150<br>151<br>152<br>153<br>154<br>155<br>156<br>157<br>158<br>159 | 148.2<br>149.1<br>150.1<br>151.1<br>152.1<br>153.1<br>154.1<br>155.1<br>156.1<br>157.0 | 23.6<br>23.8<br>23.9<br>24.1<br>24.2<br>24.4<br>24.6<br>24.7<br>24.9 | 210<br>211<br>212<br>213<br>214<br>215<br>216<br>217<br>218<br>219 | 207.4<br>208.4<br>209.4<br>210.4<br>211.4<br>213.3<br>214.3<br>215.9<br>216.3 | 33.0<br>33.2<br>33.5<br>33.6<br>33.6<br>33.8<br>33.9<br>34.1<br>34.3 | 272<br>273<br>274<br>275<br>276<br>277<br>278<br>279        | 266.7<br>267.7<br>268.7<br>269.6<br>270.6<br>271.6<br>272.6<br>273.6<br>274.6<br>275.6 | 42.4<br>42.6<br>42.7<br>42.9<br>43.0<br>43.2<br>43.3<br>43.5<br>43.6 |
| 40<br>41<br>42<br>43<br>44<br>45<br>46<br>47<br>48       | 39.5<br>41.5<br>42.5<br>43.5<br>44.4<br>45.4<br>46.4                 | 6.4<br>6.6<br>6.7<br>6.9<br>7.0<br>7.2<br>7.4<br>7.5 | 104<br>105<br>106<br>107<br>108                          | 99.8<br>100.7<br>101.7<br>102.7<br>103.7<br>104.7<br>105.7           | 15.6<br>15.8<br>16.0<br>16.1<br>16.3<br>16.4<br>16,6<br>16.7         | 160<br>161<br>162<br>163<br>164<br>165<br>166<br>167<br>168        | 159.0<br>160.0<br>161.0<br>162.0<br>163.0<br>164.0<br>165.9                            | 25.2<br>25.3<br>25.5<br>25.7<br>25.8<br>26.0<br>26.1<br>26.3         | 220<br>221<br>222<br>223<br>224<br>225<br>226<br>227<br>228        | 217.3<br>218.3<br>219.3<br>220.3<br>221.2<br>222.2<br>223.2<br>224.2<br>225.2 | 34.9<br>35.0<br>35.2<br>35.4<br>35.5<br>35.7                         | 280<br>281<br>282<br>283<br>284<br>285<br>286<br>287<br>288 | 276.6<br>277.5<br>278.5<br>279.5<br>280.5<br>281.5<br>282.5<br>283.5                   | 44.0<br>44.1<br>44.3<br>44.4<br>44.6<br>44.7<br>44.9<br>45.1         |
| 50<br>51<br>52   | 48.4<br>49.4<br>50.4<br>51.4   | 7.8<br>8.0   |  | 107.7<br>108.6<br>109.6<br>110.6                                     |  |  | 166.9<br>167.9<br>168.9<br>169.9   | 26.6<br>26.8   | 230  | 226.2<br>227.2<br>228.2<br>229.1  | 36.1   | 289<br>290<br>291<br>292                                    | 285.4<br>286.4<br>287.4<br>288.4   | 45.4   |
| 53<br>54<br>55<br>56<br>57<br>58                         | 52.3<br>53.3<br>54.3<br>55.3<br>56.3<br>57.3                         | 8.3<br>8.4<br>8.6<br>8.8<br>8.9                      |  | 111.6<br>112.6<br>113.6<br>114.6<br>115.6<br>116.5                   | 17.7<br>17.8<br>18.0<br>18.1   | 173<br>174<br>175<br>176<br>177                                    | 170.9<br>171.9<br>172.8<br>173.8<br>174.8<br>175.8                                     | 27.1<br>27.2<br>27.4<br>27.5<br>27.7                                 | 233<br>234<br>235<br>236<br>237                                    | 230.1<br>231.1<br>232.1<br>233.1<br>234.1<br>235.1                            | 36.4<br>36.6<br>36.8<br>36.9<br>37.1<br>37.2                         | 293<br>294<br>295<br>296                                    | 288.4<br>289.4<br>290.4<br>291.4<br>292.4<br>293.3                                     | 45.8<br>46.0<br>46.1<br>46.3<br>46.5                                 |
| 59<br>60<br>Dist   | 58.3<br>59.3   | 9.2<br>9.4   | 119<br>120   | 117.5<br>118.5   | 18.6<br>18.8   | 179<br>180   | 176.8<br>177.8   | 28.0<br>28.2   | 239<br>240   | 236.1<br>237.0<br>Dep.  | 37.4<br>37.5   | 299<br>300  | 295.3<br>296.3   | 46.8<br>46.9   |
|  | - i-ep. (  | aī   | J 1718C.   | . Dep. 1   | J.b. 1 . L   |  | Degre  |  | 1) 15%   | Dep.  | ı.Lat  | U DIST.   | i neb  | -w.Lat   |

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

| l          |              | 1 KA  | LICOL    | 1710         | DE, 1        |            | Degr           |                     | S OF       | 11115          | QUAL | MAIN       | <u></u>        |       |
|------------|--------------|-------|----------|--------------|--------------|------------|----------------|---------------------|------------|----------------|------|------------|----------------|-------|
|            | 10.1         | -     | . 5      | ID T         | D. 1         |            |                |                     | . D'.      | ID r           | ·D1  | . D'.      | ID T           | J D-  |
| Dist.      | D.Lat        | Dep.  | Dist.    | DLat         | Dep.         | Dist.      | D.J.at         | Dep.                | Dist.      | DTTS           | Dep. | Dist.      | DLat           | Dep   |
| 1          | 1.0          | 0.2   | 61       | 60.1         | 10.6         | 121        | 119.2          | 21.0                | 181        | 178.9          | 31.4 | 241        | 237.9          | 41.8  |
| 2          | 2.0          | 0.3   | 62       | 61.1         | 10.8         | 122        | 120.1          | 21.2                | 182        | 179.2          | 31.6 | 242        | 238.9          | 142.0 |
| ន          | 3.0          | 0.5   | 63       | 62.0         |              | 123        | 121.1          | 21.4                | 183        | 180.2          | 31.8 | 243        | 239.3          | 42 2  |
| 4          | 3.9          | 0.7   | 64       | 63.0         | 11.1         | 124        | 122.1          | 21.5                | 184        | 181.2          | 82.0 | 244        | 240.9          | 42.4  |
| 5          | 4.9          | 0.9   | 65       | 64.0         | 11.3         | 125        | 123.1          | 21.7                | 185        | 182.2          | 32.1 | 245        | 241.9          | 42.5  |
| 6          | 5.9          | 1.0   | 66       | 65.0         | 11.5         | 126        | 124.1          | 21.9                | 186        | 183.2          | 32.3 | 246        | 242.9          | 42.7  |
| 7          | 6.9          | 1.2   | 67       | 66.0         | 11.6         | 127        | 125.1          | 22.1                | 187        | 184.2          | 32.5 | 247        | 243.2          | 42.9  |
| 8          | 7.9          | 1.4   | 68       | 67.0         | 11,8         | 128        | 126.1          | 22.2                | 188        | 185.1          | 32.6 | 248        | 244.2          | 43.1  |
| 9          | 8.9          | 1.6   | 69       | 68.0         | 12.0         | 129        | 127.0          | 22.4                | 189        | 186.1          | 32.8 | 249        | 245.2          | 43.2  |
| 10         | 9.8          | 1.7   | 70       | 68.9         | 12.2         | 130        | 128.0          | 22.6                | 190        | 187.1          | 33.0 | 250        | 246.2          | 43.4  |
|            | 10.0         |       | 71       | 60.0         | 10.0         | 101        | 1.10           | 22.7                | 101        | 100 1          | 90 0 | 051        | 047 0          | 140 6 |
| II         | 10.8         |       | 71       | 69.9         | 12.3         | 131        | 129.0          |                     | 191        | 188.1          |      | 251        | 247.2          |       |
| 12         | 11.8         |       | 72       | 70.9         | 12.5<br>12.7 | 132        | 130.0          | $\frac{22.9}{23.1}$ | 192        | 189.1<br>190.1 |      | 252<br>253 | 248.2<br>249.2 |       |
| 13         | 12.8         |       | 73       | 71.9         |              | 183        | 131.0<br>132.0 | 23.3                | 193        |                |      | 254        | 250.1          |       |
| 14         | 13.8         | 2.4   |          |              | 12.8         | 134        |                | 23.4                | 195        | 191.1          |      | 255        | 251.1          |       |
| 15         | 14.8         | 2.6   | 75       | 73.9<br>74.8 | 13.0         | 135        | 152.9<br>133.9 | 23.6                | 196        | 192.0 $193.0$  |      | 256        | 252.1          |       |
| 16         | 15.8         | 2.8   | 76       |              | 13.2         | 136        |                | 23.8                |            |                |      | 257        |                |       |
| 17<br>18   | 16.7<br>17.7 | 3.0   | 77       | 75.8<br>76.8 | 13.4<br>13.5 | 137<br>138 | 134.9<br>135.9 | 24.0                | 197<br>198 | 194.0<br>195.0 |      | 258        | 253.1          |       |
| 19         |              | 3.1   | L        |              |              |            |                | 24.1                | 198        |                |      | 259        | 254.1          |       |
|            | 18.7         | 3.3   | 79<br>80 | 77.8         | 13.7         | 139        | 136.9<br>137.9 | 24.3                | 200        | 196.0          |      | 260        | 255.1          |       |
| 20         | 19.7         | 3.5   |          | 78.8         | 13.9         | 140        | 131.9          | ~ = . 3             | 200        | 197.0          | 33.1 | 200        | 256.1          | 123.1 |
| 21         | 20.7         | 3.6   | 81       | 79.8         | 14.1         | 141        | 138.9          | 24.5                | 201        | 197.9          | 34.9 | 261        | 257.0          | 45.8  |
| 22         | 21.7         | 3.8   | 82       | 80.8         | 14.2         | 142        | 139.8          | 24.7                | 202        | 198.9          | 35.1 | 262        | 258.0          | 45.5  |
| 23         | 22.7         | 4.0   | 83       | 81.7         | 14.4         | 143        | 140.8          | 24.8                | 203        | 199.9          | 35.3 | 263        | 259.0          | 45.7  |
| 24         | 23.6         | 4.2   | 84       | 82.7         | 14.6         | 144        | 141.8          | 25.0                | 204        | 200.9          | 35.4 | 264        | 260.0          | 45.8  |
| 25         | 24.6         | 4.3   | 85       | 83.7         | 14.8         | 145        | 142.8          | 25.2                | 205        | 201.9          | 35.6 | 265        | 261.0          |       |
| 26         | 25.6         | 4.5   | 86       | 84.7         | 14.9         | 146        | 143.8          | 25.4                | 206        | 202.9          | 35.8 | 266        | 262.0          | 46.2  |
| 27         | 26.6         | 4.7   | 87       | 85.7         | 15.1         | 147        | 144.8          | 25.5                | 207        | 203.9          | 35.9 | 267        | 262.9          | 46.4  |
| 28         | 27.6         | 4.9   | 88       | 86.7         | 15.3         | 148        | 145.8          | 25.7                | 208        | 204.8          | 36.1 | 268        | 263.9          | 46.5  |
| 29         | 28.6         | 5.0   | 89       | 87.6         | 15.5         | 149        | 146.7          | 25.9                | 209        | 205.8          | 36.3 | 269        | 264.9          | 46.7  |
| 30         | 29.5         | 5.2   | 90       | 88.6         | 15.6         | 150        | 147.7          | 26.0                | 210        | 206.8          | 36.5 | 270        | 265.9          | 46.9  |
| 31         | 30.5         | 5.4   | 91       | 89.6         | 15.8         | 151        | 148.7          | 26.2                | 211        | 207.8          | 26 6 | 271        | 266.9          | 147 1 |
| 32         | 31.5         | 5.6   | 92       | 90.6         | 16.0         | 152        | 149.7          | 26.4                | 212        | 208.8          |      | 272        | 267.9          |       |
| 33         | 32.5         | 5.7   | 93       | 91.6         | 16.1         | 153        | 150.7          | 26.6                | 213        | 209 8          |      | 273        | 268.9          |       |
| 34         | 33.5         | 5.9   | 94       | 92.6         | 16.3         | 154        | 151.7          | 26.7                | 214        | 210.7          |      | 274        | 269.8          |       |
| 35         | 34.5         | 6.1   | 95       | 93.6         | 16.5         | 155        | 152.6          | 26.9                | 215        | 211.7          |      | 275        | 270.8          |       |
| <b>3</b> 6 | 35.5         | 6.3   | 96       | 94.5         | 16.7         | 156        | 153.6          |                     | 216        |                | 37.5 | 276        | 271.8          |       |
| 37         | 36.4         | 6.4   | 97       | 95.5         | 16.8         | 157        | 154.6          | 27.3                | 217        | 213.7          |      | 277        | 272.8          |       |
| 38         | 37.4         | 6.6   | 98       | 96.5         | 17.0         | 158        | 155.6          |                     | 218        | 214.7          |      | 278        | 273.8          |       |
| 39         | 38.4         | 6.8   | 99       | 97.5         | 17.2         | 159        | 156.6          | 27.6                | 219        | 215.7          |      | 279        | 274.8          |       |
| 40         | 39.4         | 6.9   | 100      | 98.5         | 17.4         | 160        | 157.6          | 27.8                | 220        | 216.7          |      | 280        | 275.7          |       |
| l          | <u>'</u>     |       |          |              |              |            |                |                     |            | <u> </u>       |      |            | ·              | !     |
| 41         | 40.4         | 7.1   | 101      | 99.5         | 17.5         | 161        | 158.6          | 28.0                | 221        |                | 38.4 | 281        | 276.7          |       |
| 42         | 41.4         | 7.3   | 102      | 100.5        | 17.7         | 162        | 159.5          | 28.1                | 222        | 218.6          |      | 282        | 277.7          |       |
| 43         | 42.3         |       | 103      | 101.4        | 17.9         | 163        | 160 5          | 28.3                | 223        | 219.6          |      | 283        | 278.7          |       |
| 44         | 43.3         | 7.6   | 104      | 102.4        |              | 164        | 161.5          | 28.5                | 224        | 220.6          |      | 284        | 279.7          |       |
| 45         | 44.3         | 7.8   | 105      | 103.4        |              | 165        | 162.5          | 28.7                | 225        | 221.6          |      | 285        | 280.7          |       |
| 46         | 45.3         | 8.0   | 106      | 104.4        |              | 166        | 163.5          |                     | 226        |                | 39.2 | 286        | 281.7          |       |
| 47         | 46.3         |       | 107      | 105.4        |              | 167        | 164.5          |                     | 227        |                | 39.4 | 287        | 282.6          |       |
| 48<br>49   | 47.3         |       | 108      | 106.4        |              | 168        | 165.4          |                     | 228        |                | 39.6 |            | 283.6          |       |
|            | 48.3         |       | 109      | 107.3        |              | 169        | 166.4          |                     | 229        |                | 39.8 | 289        | 284.6          |       |
| 5₽         | 49.2         | 8.7   | 110      | 108.3        | 19.1         | 170        | 167.4          | 29.5                | 230        | 320.5          | 39.9 | 290        | 285.6          | 30.4  |
| 51         | 50.2         | 8.9   |          | 109.3        |              | 171        | 168.4          |                     | 231        | 227.5          | 40.1 | 291        | 286.6          | 50.5  |
| 52         | 51.2         |       |          |              | 19.4         | 172        |                |                     | 232        |                | 40.3 |            | 287.6          |       |
| 53         | 52.2         |       |          | 111.8        | 19.6         | 173        | 170.4          |                     | 233        | 229.5          | 40.5 |            | 288.5          | 50.9  |
| 54         | 53.2         |       | 114      | 112.3        | 19.8         | 174        | 171.4          | 30.2                | 234        |                | 49.6 | 294        | 289.5          |       |
| 55         | 54 2         |       |          | 113.8        |              | 175        | 172.3          |                     | 235        |                | 40.8 | 295        | 290.5          | 51.2  |
| 56         | 35.1         |       |          | 114.2        |              | 176        | 173.3          |                     |            |                | 41.0 | 296        | 291.5          |       |
| 57         | 56.1         |       | 117      | 115.2        | 20.5         | 177        | 174.8          | 30.7                | 237        |                | 41.2 | 297        | 292.5          |       |
| 58         | 57.1         |       | 118      | 116.2        | 20.5         | 178        | 175.3          |                     |            |                | 41.3 | 298        | 293.5          |       |
| 59         | 58.1         |       | 119      | 117.2        |              | 179        | 176.3          |                     |            |                | 41.5 | 299        | 294.5          |       |
| 60         | 59.1         | 10.4  | 120      | 118.2        | 20.8         | 180        | 177.3          | 31.3                | 240        | 236.4          | 41.7 | 300        | 295.4          | 52.1  |
| Dist.      | Dep.         | D.Lat | Dist.    | Dep.         | D.Lat        | Dist.      | Dep.           | D.Lat               | Dist.      | Dep.           | DJat | Dist.      | Dep.           | DLat  |
| I          |              |       |          |              |              |            |                |                     |            | P'             |      |            | F.             |       |
| li l       |              |       |          |              |              | O.         | ) Degr         | CC3.                |            |                |      |            |                |       |

80 Degrees.

| -          |              |            |            |                |              |                     | 11 Deg           | rees.        |            |                |              |            |                |              |
|------------|--------------|------------|------------|----------------|--------------|---------------------|------------------|--------------|------------|----------------|--------------|------------|----------------|--------------|
| Dist       | D.Lat        | Dep.       | Dist.      | D. Lat         | Dep.         |                     | D.Lat            |              | Dist.      | D. Lat         | Dep.         | Dist.      | D.Lat          | Dep.         |
| 1          | 1.0          | 0.2        | 61         | 59.9           | 11.6         | 121                 | 118.8            | 23.1         | 181        | 177.7          | 34.5         | 241        | 236.6          | 46.0         |
| 2          | 2.0          | 0.4        | 62         |                | 11.8         |                     | 119.8            | 23.3         | 182        | 178.7          | 34.7         | 242        | 237.6          | 46.2         |
| 8          | 2.9          | 0.6        | 63         |                | 12.0         | 123                 | 120.7            | 23.5         | 183        | 179.6          | 34.9         | 243        | 238.5          | 46.4         |
| 5          | 3.9<br>4.9   | 0.8        | 64<br>65   |                | 12.2<br>12.4 | 124<br>125          | 121.7 $122.7$    | 23.7<br>23.9 | 184        | 180.6<br>181.6 | 35.1         | 244        | 239.5<br>240.5 | 46.6<br>46.7 |
| 6          | 5.9          | 1.1        | 66         |                | 12.6         | 126                 | 123.7            | 24.0         | 186        | 182.6          | 35.5         | 245<br>246 | 241.5          | 46.9         |
| 7          | 6.9          | 1.3        | 67         |                | 12.8         | 127                 | 124.7            | 24.2         | 187        | 183.6          | 35.7         | 247        | 242.5          | 47.1         |
| 8          | 7.9          | 1.5        | 68         |                | 13.0         | 128                 | 125.6            | 24.4         | 188        | 184.5          | 35.9         | 248        | 243.4          | 47.3         |
| 9          | 8.8          | 1.7        | 69         |                | 13.2         |                     | 126.6            | 24.6         | 189        | 185.5          | 36.1         | 249        | 244.4          | 47.5         |
| 10         | 9.8          | 1.9        | 70         | 68.7           | 13.4         | 130                 | 127.6            | 24.8         | 190        | 186.5          | 36.3         | 250        | 245.4          | 47.7         |
| 11         | 10.8         | 2.1        | 71         | 69.7           |              |                     | 128.6            | 25.0         | 191        | 187.5          | 36.4         | 251        | 246.4          | 47.9         |
| 12         | 11.8         | 2.3        | 72         |                | 13.7         |                     | 129.6            | 25.2         | 192        | 188.5          | 36.6         | 252        | 247.4          | 48.1         |
| 13<br>14   | 12.8         | 2.5        | 73<br>74   |                | 13.9         |                     | 130.6            | 25.4         | 193        | 189.5<br>190.4 | 36.8         | 253        | 248.4<br>249.3 | 48.3<br>48.5 |
| 15         | 13.7<br>14.7 | 2.7        | 75         |                | 14.1         | 134<br>135          | 131.5<br>132.5   | 25.6<br>25.8 | 194<br>195 | 191.4          | 37.0<br>37.2 | 254<br>255 | 250.3          | 48.7         |
| 16         | 15.7         | 3.1        | 76         |                | 14.5         | 136                 | 183.5            | 26.0         | 196        | 192.4          | 37.4         | 256        | 251.3          | 48.8         |
| 17         | 16.7         | 3.2        | 77         |                | 14.7         | 137                 | 134.5            | 26.1         | 197        | 193.4          | 37.6         | 257        | 252.3          | 49,0         |
| 18         | 17.7         | 3.4        | 78         |                | 14.9         | 138                 | 135.5            | 26.3         | 198        | 194.4          | 37.8         | 258        | 253.3          | 49.2         |
| 19<br>20   | 18.7         | 3.6        | 79         |                | 15.1         | 139                 | 136.4            | 26.5         | 199        | 195.3          | 38.0         | 259        | 254.2          | 49.4         |
|            | 19.6         | 3.8        | 80         |                | 15.3         |                     | 137.4            | 26.7         | 200        | 196.3          | 38.2         | 260        | 255.2          |              |
| 21         | 20.6         | 4.0        | 81         | 79.5           |              | 141                 | 138.4            | 26.9         | 201        | 197.3          | 38.4         | 261        | 256.2          | 49.8         |
| 22<br>23   | 21.6         | 4.2        | 82         | 80.5<br>81.5   |              | 142                 | 139.4            | 27.1         | 202        | 198.3          | 38.5         | 262        | 257.2<br>258.2 | 50.0<br>50.2 |
| 25         | 22.6<br>23.6 | 4.4<br>4.6 | 83         | 82.5           |              | 143<br>144          | 140.4            | 27.3<br>27.5 | 203<br>204 | 199.3<br>200.3 | 38.7         | 263<br>264 | 259.1          | 50.2         |
| 25         | 24.5         | 4.8        | 85         |                | 16.2         |                     | 142.9            | 27.7         | 205        | 201.2          | 39.1         |            | 260.1          | 50.6         |
| 26         | 25.5         | 5.0        | 86         | 84.4           |              | 146                 | 143.3            | 27.9         | 206        | 202.2          | 39.3         | 266        | 261.1          | 50.8         |
| 27         | 26.5         | 5.2        | 87         | 85.4           |              | 147                 | 144.3            | 28.0         | 207        | 203.2          | 39.5         | 267        | 262.1          | 50.9         |
| 28<br>29   | 27.5         | 5.3        | 88         |                | 16.8         | 148                 | 145.3            | 28.2         | 208        | 204.2          | 39.7         | 268        | 263.1          | 51.1         |
| 30         | 28.5<br>29.4 | 5.5<br>5.7 | 89<br>90   | 87.4<br>88.3   | 17.2         | 149<br>1 <i>5</i> 0 | 146.3<br>147.2   | 28.4<br>28.6 | 209<br>210 | 205.2<br>206.1 | 39.9<br>40.1 | 269<br>270 | 264.1<br>265.0 | 51.8<br>51.5 |
|            |              |            |            |                |              |                     |                  |              |            | <u> </u>       |              |            | <u></u> '      |              |
| 31<br>32   | 30.4<br>31.4 | 5.9<br>6.1 | 91         | 89.3<br>90.3   |              | 151<br>152          | $148.2 \\ 149.2$ | 28.8<br>29.0 | 211<br>212 | 207.1<br>208.1 | 40.3         | 271<br>272 | 266.0<br>267.0 | 51.7<br>51.9 |
| 33         | 32.4         | 6.3        | 93         | 91.3           |              | 153                 | 150.2            | 29.2         | 213        | 209.1          | 40.6         | 273        | 268.0          | - 1          |
| 34         | 33.4         | 6.5        | 94         | 92.3           | 17.9         | 154                 | 151.2            | 29.4         | 214        | 210.1          | 40.8         | 274        | 269.0          | 52.3         |
| 35         | 34.4         | 6.7        | 95         | 93.3           |              | 155                 | 152.2            | 29.6         | 215        | 211.0          | 41.0         | 275        | 269.9          | 52.5         |
| 36<br>37   | 35.3<br>36.3 | 6.9<br>7.1 | 96<br>97   | 94.2<br>95.2   |              | 156<br>157          | 153.1<br>154,1   | 29.8         | 216<br>217 | 212.0<br>213.0 | 41.2         | 276<br>277 | 270.9 $271.9$  | 52.7<br>52.9 |
| 38         | 37.3         | 7.5        | 98         | 96.2           |              | 158                 | 155.1            | 30.0         | 218        | 214.0          | 41.6         | 278        | 272.9          | 53.0         |
| 39         | 38.3         | 7.4        | 99         | 97.2           |              | 159                 | 156.1            | 30.3         | 219        | 215.0          | 41.8         | 279        | 273.9          | 53.2         |
| 40         | 39.3         | 7.6        | 100        | 98.2           |              | 160                 | 157.1            | 30.5         | 220        | 216.0          | 42.0         | 280        | 274.9          | 53.4         |
| 41         | 40.2         | 7.8        | 101        | 99.1           | 19.3         | 161                 | 158.0            | 80.7         | 221        | 216.9          | 42.2         | 281        | 275.8          | 53.6         |
| 42         | 41.2         | 8.0        | 102        | 100.1          | 19.5         | 162                 | 159.0            | 30.9         | 222        | 217.9          | 42.4         | 282        | 276.8          | 53.8         |
| 43         | 42.2         | 8.2        | 103        | 101.1          |              | 163                 | 160.0            | 31.1         | 223        | 218.9          | 42.6         | 283        | 277.8          | 54.0         |
| 44<br>45   | 43.2<br>44.2 | 8.4        | 104        | 102.1          |              | 164<br>165          | 161.0<br>162.0   | 31.3         | 224<br>225 | 219.9<br>220.9 | 42.7<br>42.9 | 284<br>285 | 278.8<br>279.8 | 54.2<br>54.4 |
| 46         | 45.2         | 8.8        | 106        | 103.1          |              | 166                 | 163.0            | 31.5         | 226        | 221.8          | 43.1         | 286        | 280.7          | 54.6         |
| 47         | 46.1         | 9.0        | 107        | 105.0          |              | 167                 | 163.9            | 31.9         | 227        | 222.8          | 48.8         | 287        | 281.7          | 54.8         |
| 48         | 47.1         | 9.2        | 108        | 106.0          |              |                     | 164.9            | 32.1         | 228        | 223.8          | 43.5         | 288        | 282.7          | 55.0         |
| 49<br>50   | 48.1<br>49.1 | 9.3        | 109        | 107.0          |              |                     | 165.9            | 32.2         | 229        | 224.8          | 49.7         | 289        | 283.7<br>284.7 | 55.1<br>55.3 |
|            | !            | 9.5        | 110        | 108.0          |              | 170                 | 166.9            | 32.4         | 230        | 225.8          | 43.9         | 290        |                |              |
| 51<br>52   | 50.1         | 9.7        |            | 109.0          |              |                     | 167.9            |              | 231        | 226.8          | 44.1         | 291        | 285.7<br>286.6 |              |
| 53<br>53   | 51.0<br>52.0 |            |            | 109.9          |              |                     | 168.8<br>169.8   |              |            | 227.7<br>228.7 |              |            | 287.6          |              |
| 54         | 53.0         |            |            | 111.9          |              |                     | 170.8            |              | 234        | 229.7          | 44.6         |            | 288.6          |              |
| 55         | 54.0         | 10.5       | 115        | 112.9          | 21.9         | 175                 | 171.8            | 33.4         | 235        | 230.7          | 44.8         | 295        | 289.6          | 56.3         |
| 56         | 55.0         |            | 116        | 113.9          |              |                     | 172.8            |              | 236        | 231.7          | 45.0         | 296        | 290.6          |              |
| 57<br>58   | 56.0<br>56.9 |            | 117        | 114.9          |              |                     | 173.7<br>174.7   |              | 237        | 232.6<br>233.6 |              | 297<br>298 | 291.5<br>292.5 |              |
| <i>5</i> 9 | 57.9         |            | 118<br>119 | 115.8<br>116.8 |              | 178<br>179          | 175.7            | , ,          | 239        | 233.6          |              | 1          | 293.5          |              |
| 60         | 58.9         |            |            | 117.8          |              |                     | 176.7            |              | 240        | 235.6          |              | 300        |                | 57.2         |
| Dist.      | Dep.         | D.Lat      | Dist.      | Dep.           | Dlat         | Dist.               | Dep.             | D. Lat       | Dist.      | Dep.           | D. Lat       | Dist.      | Dep.           | D.Lat        |
|            |              |            |            | F              | ,            |                     | F.               |              |            | · - F          |              |            | <u> </u>       |              |

|                                  | -   | -     |            |                |            |            | Degree         |            |            |                |          |              | - ·            |              |  |
|----------------------------------|---|-------|------------|----------------|------------|------------|----------------|------------|------------|----------------|----------|--------------|----------------|--------------|--|
| Dist.                            | D.Lat   | Dep.  | Dist.      | D.Lat          | Dep:       | Dist.      | DLat           | Dep.       | Dist.      | D.Lat          | Dep      | Dist.        | D.Lat          |              |  |
| ī                                |   | 0.1   | 61         | 60.9           | 4.3        | 121        | 120.7          | 8.4        | 181        | 180.6          |          | 241          | 240.4          | 16.8         |  |
| 3                                | 2.0<br>3.0  | 0.1   | 62<br>63   | 61.8           | 4.3        | 122        | 121.7          | 8.5        | 182<br>183 | 181.6<br>182.6 |          |              | 241.4<br>242.4 | 16.9<br>17.0 |  |
| 4                                | 4.0   | 0.2   | 64         | 62.8<br>63.8   | 4.4        | 123        | 122.7 $123.7$  | 8.6<br>8.6 | 184        | 183.6          |          | 244          | 243.4          |              |  |
| 5                                | 5.0   | 0.3   | 65         | 64.8           | 4.5        | 125        | 124.7          | 8.7        | 185        | 184.5          |          | 245          | 244.4          | 17.1         |  |
| 6                                | 6.0   | 0.4   | <b>6</b> 6 | 65.8           | 4.6        | 126        | 125.7          | 8.8        | 186        | 185.5          |          | 246          | 245.4          |              |  |
| . 7                              | 7.0   | 0.5   | 67         | 66.8           | 4.7        | 127        | 126.7          | 8.9        | 187        | 186.5          |          | 247<br>248   | 246.4<br>247.4 |              |  |
| 8 9                              | 8.0<br>9.0  | 0.6   | 68<br>69   | 67.8<br>68.8   | 4.7<br>4.8 | 128<br>129 | 127.7<br>128.7 | 8.9<br>9.0 | 188<br>189 | 187.5<br>188.5 |          | 249          | 248.4          |              |  |
| 10                               | 10.0  | 0.7   | 70         | 69.8           | 4.9        | 130        | 129.7          | 9.1        | 190        | 189.5          |          | 250          | 249.4          |              |  |
| 11                               | 11.0  | 0.8   | 71         | 70.8           | 5.0        | 131        | 130.7          | 9.1        | 191        | 190.5          |          | 251          | 250.4          |              |  |
| 12                               | 12.0  | 0.8   | 72         | 71.8           | 5.0        | 132        | 131.7          | 9.2        | 192        | 191.5          | 13.4     | 252          | 251.4          | 17.6         |  |
| 13                               | 13.0  | 0.9   | 73         | 72.8           | 5.1        | 133        | 132.7          | 9.3        | 193        | 192.5          |          | 253          | 252.4<br>253.4 |              |  |
| 14<br>15                         | 14.0<br>15.0  | 1.0   | 74<br>75   | 73.8<br>74.8   | 5.2<br>5.2 | 134<br>135 | 133.7          | 9.3        | 194<br>195 | 193.5<br>194.5 |          | 254<br>255   | 253.4<br>254.4 |              |  |
| 16                               | 16.0  |       | 76         | 75.8           | 5.3        | 136        | 134.7<br>135.7 | 9.4<br>9.5 | 195        | 194.5          |          | 256          | 255.4          |              |  |
| 17                               | 17.0  | 1.2   | 77         | 76.8           | 5.4        | 137        | 136.7          | 9.6        | 197        | 196.5          | 13.7     | 257          | 256.4          | 17.9         |  |
| 18                               | 18.0  |       | 78         | 77.8           | 5.4        | 138        | 137.7          | 9.6        | 198        | 197.5          |          | 258          | 257.4          |              |  |
| 19<br>20                         | 19.0<br>20.0  | 1.3   | 79<br>80   | 78.8<br>79.8   | 5.5<br>5.6 | 139<br>140 | 138.7<br>139.7 | 9.7        | 199<br>200 | 198.5<br>199.5 |          | 259<br>260   | 258.4<br>259.4 |              |  |
|                                  |   |       |            |                |            | <u> </u>   |                |            | ļ          |                |          |              |                | -{           |  |
| 21<br>22                         | 20.9<br>21.9  | 1.5   | 81<br>82   | 80.8           | 5.7<br>5.7 | 141<br>142 | 140.7<br>141.7 | 9.8<br>9.9 | 201<br>202 | 200.5          |          | 261<br>262   | 260.4<br>261.4 |              |  |
| 23                               | 22.9  |       | 83         | 82.8           | 5.8        | 142        | 141.7          |            | 202        | 201.5          |          | 263          | 262.4          |              |  |
| 24                               | 23.9  | 1.7   | 84         | 83.8           | 5.9        | 144        | 143.6          | 10.0       | 204        | 203.5          | 14.2     | 264          | 263.4          | 18.4         |  |
| 25                               | 24.9  |       | 85         | 84.8           | 5.9        | 145        | 144.6          | 10.1       | 205        | 204.5          |          |              | 264.4          |              |  |
| 26<br>27                         | 25.9<br>26.9  | 1.8   | 86<br>87   | 85.8<br>86.8   | 6.0<br>6.1 | 146<br>147 | 145.6<br>146.6 |            | 206        | 205.5<br>206.5 |          | 266<br>267   | 265.4<br>266.3 |              |  |
| 28                               | 27.9  |       | 88         | 87.8           | 6.1        | 148        | 147.6          |            | 207        | 200.5          |          | 268          | 267.9          | 18.7         |  |
| 29                               | 28.0  | 2.0   | 89         | 88.8           | 6.2        | 149        | 148.6          | 10.4       | 209        | 208.5          | 14.6     | 269          | 268.3          | 18.8         |  |
| 30                               | 29.9  | 2.1   | 90         | 89.8           | 6.3        | 150        | 149.6          |            | 210        | 209.5          |          | 270          | 269.9          | 18.8         |  |
| 31                               | 30.9  |       | 91         | 90.8           | 6.3        | 151        | 150.6          |            | 211        | 210.5          |          | 271          |                | 18.9         |  |
| 32                               |   |       | 92         | 91.8           |            | 152        | 151.6          | 10.6       | 212        | 211.5          | 14.8     |              |                |              |  |
|                                  |   |       |            |                |            |            |                |            |            |                |          |              |                |              |  |
| 35                               | 32     31.9     2.2     92     91.8     6.4     152     151.6     10.6     212     211.5     14.8     272     271.3     19.       33     32.9     2.3     93     92.8     6.5     153     152.6     10.7     213     212.5     14.9     273     272.3     19.       34     33.9     2.4     94     93.8     6.6     154     153.6     10.7     214     213.5     14.9     274     273.3     19.       35     34.9     2.4     95     94.8     6.6     155     154.6     10.8     215     214.5     15.0     275     274.8     19. |       |            |                |            |            |                |            |            |                |          |              |                |              |  |
| 36                               | 35.9  | 2.5   | 96         | 95.8           | 6.7        | 156        | 155.6          | 10.9       | 216        | 215.5          | 15.1     | 276          | 275.9          | 19.3         |  |
| 37                               | 36.9  |       | 97         | 96.8           |            | 157        | 156.6          |            | 217        | 216.5          |          |              |                | 19.3         |  |
| 38<br>39                         | 37.9<br>38.9  |       | 98<br>99   | 97.8<br>98.8   |            | 158<br>159 | 157.6<br>158.6 |            | 218        | 217.5<br>218.5 |          |              | 277.9<br>278.9 |              |  |
| 40                               | 39.9  |       | 100        | 99.8           |            | 160        | 159.6          |            | 220        | 219.5          |          |              | 279.9          |              |  |
| 41                               | 40.9  |       | 101        | 100.8          | 7.0        | 161        | 160.6          | <u> </u>   | 221        | 220.5          |          | <del> </del> | 280.9          | 19.6         |  |
| 42                               | 41.9  | 2.9   | 102        | 101.8          | 7.1        | 162        | 161.6          | 11.3.      | 222        | 221.5          | 15.5     | 282          | 281.9          | 19.7         |  |
| 43                               | 42.9  | 8.0   | 103        | 102.7          | 7.3        | 163        | 162.6          | 11.4       | 223        | 222.5          | 15.6     | 283          | 282.3          |              |  |
| 44                               | 43.9  |       | 104        | 103.7          | 7.3        | 164        | 163.6          |            | 224        | 223.5          |          | 284<br>285   | 283.3<br>284.3 |              |  |
| 45<br>46                         | 44.9  |       | 105        | 104.7          | 7.3        | 165<br>166 | 164.6<br>165.6 |            | 225        | 224.5<br>225.4 |          | 286          | 285.3          |              |  |
| 47                               | 46.9  | 3.3   | 107        | 106.7          | 7.5        | 167        | 166.6          | 11.6       | 227        | 226.4          | 15.8     | 287          | 286.3          | 20.0         |  |
| 48                               | 47.9  | 3.3   | 108        | 107.7          | 7.5        | 168        | 167.6          | 11.7       | 228        | 227,4          | 15.9     | 288          | 287.3          |              |  |
| 49<br><i>5</i> ນ                 | 48.9  |       | 109        | 108.7          | 7.6        | 169        | 168.6          |            | 229        | 228.4          |          | 289          | 288.3<br>289.3 |              |  |
|                                  | 49.9  |       | 110        | 109.7          | 7.7        | 170        | 169.6          |            | 230        | 229.4          | ·        |              |                | <u>'</u>     |  |
| 51<br>52                         | 50.9<br>51.9  |       | 111        | 110.7<br>111.7 | 7.7        | 171<br>172 | 170.6<br>171.6 |            | 231        | 230.4<br>231.4 |          | 291<br>292   | 290.8<br>291.8 |              |  |
| 53                               | 52.9  |       | 113        | 112,7          | 7.9        | 172        | 172.6          |            |            | 231.4          | 16.3     | 293          | 292.3          | 20.4         |  |
| 54                               | 53.9  | 3.8   | 114        | 113,7          | 8.0        | 174        | 173.6          | 12.1       | 234        | 233.4          | 16.3     | 294          | 293.3          | 20.5         |  |
| 55                               | 54.9  | 3.8   | 115        | 114.7          | 8.0        | 175        | 174.6          | 12.2       | 235        | 234.4          | 16.4     | 295          | 294.3          | 20.6         |  |
| 56<br>57                         | 55.9<br>56.9  |       |            | 115.7<br>116.7 |            | 176<br>177 | 175.6<br>176.6 |            | 236<br>237 | 235.4<br>236.4 |          |              | 295.3<br>296.3 |              |  |
| 54<br>55<br>56<br>57<br>58<br>59 | 57,9  |       |            | 117.7          |            | 178        | 177.6          |            | 238        | 230.4          |          | 1            | 297.3          | 20.8         |  |
| 59                               | 58.9  | 4.1   | 119        | 118.7          | 8.3        | 179        | 178.6          | 12.5       | 239        | 238.4          | 16.7     | 299          | 298.5          | 20.9         |  |
| 60                               | 59,9  | I     | 120        | 119.7          | 1          | 180        | 179.6          |            | 240        | 239.4          |          | ·            | 299.3          |              |  |
| Dist.                            | Dep.  | D.Lat | Dist.      | Dep.           | DLat       | Dist.      | Dep.           | DLat       | Dist.      | Dep.           | D.lat    | Dist.        | Dep.           | D.Lat        |  |
| I                                |   |       | <u>_</u>   | <u> </u>       |            |            | 6 Degr         |            |            |                |          |              |                |              |  |
|                                  |   |       |            |                |            |            | -0-            |            |            |                | <u> </u> |              |                |              |  |

. TABLE XIII.

|          |              |            | <u></u>    |                |            | 5          | Degre          | es. ·        |            |                          |            |                |         |
|----------|--------------|------------|------------|----------------|------------|------------|----------------|--------------|------------|--------------------------|------------|----------------|---------|
| Dist.    | D.Lat        | Dep.       | Dist.      | D. Lat         | Dep.       | Dist.      |                |              | Dist.      | D.Lat Dep.               | Dist.      | D.Lat          | Dep.    |
| 1        | 1.0          | 0.1        | 61         | 60.8           | 5.3        | 121        | 120.5          | 10.5         | 181        | 180.3 15.8               | 241        | 240.1          | 21 0    |
| 2        | 2.0          | 0.2        | 62         | 61.8           | 5.4        |            | 121.5          |              | 182        | 181.3 15.9               | 242        | 241.1          |         |
| 3 4      | 3.0<br>4.0   | 0.3        | 63<br>64   | 62.8<br>63.8   | 5.5<br>5.6 | 123<br>124 | 122.5<br>123.5 |              | 185<br>184 | 182.3 15.9<br>183.3 16.0 | 243<br>244 | 242.1<br>243.1 |         |
| 5        | 5.0          | 0.3        | 65         | 64.8           | 5.7        | 125        | 124.5          | 10.9         | 185        | 184.3 16,1               | 245        | 244.1          |         |
| 6        | 6.0          | 0.5        | 66         | 65.7           | 5.8        | 126        | 125.5          | 11.0         | 186        | 185.3 16.2               | 246        | 245.1          |         |
| 7        | 7.0          | 0.6        | 67         | 66.7           | 5.8        | 127        | 126.5          | 11.1         | 187        | 186.3 16.3               | 247        | 246.1          |         |
| 8        | 8.0          | 0.7        | 68<br>69   | 67.7           | 5.9        | 128<br>129 | 127.5          | 11.2         | 188        | 187.3 16.4<br>188.3 16.5 | 248<br>249 | 247.1          |         |
| 10       | 9.0<br>10.0  | 0.8        | 70         | 68.7<br>69.7   | 6.0        | 130        | 128.5<br>129.5 | 11.2<br>11.3 | 190        | 189.3 16.6               | 250        | 248.1<br>249.0 |         |
| 11       | 11.0         |            |            |                |            |            |                |              |            |                          |            |                |         |
| 12       | 12.0         | 1.0        | 71 72      | 70.7           | 6.2<br>6.3 | 131<br>132 | 130.5<br>131.5 | 11.4         | 191<br>192 | 190.3 16.6               | 251<br>252 | 250.0<br>251.0 |         |
| 13       | 13.0         | 1.1        | 73         | 72.7           | 6.4        |            | 132.5          | 11 6         | 193        | 192.3 16.8               | 253        | 252.0          |         |
| 14       | 13.9         | 1.2        | 74         | 73.7           | 6.4        | 134        | 133.5          | 11.7         | 194        | 193.3 16.9               | 254        | 253.0          | 22.1    |
| 15<br>16 | 14.9         | 1.3        | 75         | 74.7           | 6.5        | 135<br>136 | 134.5          | 11.8         | 195<br>196 | 194.3 17.0<br>195.3 17.1 | 255<br>256 | 254.0          |         |
| 17       | 15.9<br>16.9 | 1.4        | 77         | 75.7<br>76.7   | 6.6        | 137        | 195.5<br>136.5 | 11.9<br>11.9 | 196        | 196.3 17.2               |            | 255.0<br>256.0 |         |
| 18       | 17.9         | 1.6        | 78         | 77.7           | 6.8        | 138        | 137.5          | 12.0         | 198        | 197.2 17.3               | 258        | 257.0          |         |
| 19       | 18.9         | 1.7        | 79         | 78.7           | 6.9        | 139        | 138.5          | 12.1         | 199        | 198.2 17.3               | 259        | 258.0          |         |
| 20       | 19.9         | 1.7        | 80         | 79.7           | 7.0        | 140        | 139.5          | 12.2         | 200        | 199.2 17.4               | 260        | 259.0          | 22.7    |
| 21       | 20.9         | 1.8        | 81         | 80.7           | 7.1        |            | 140.5          | 12.3         | 201        | 200.2 17.5               | 261        | 260.0          |         |
| 22<br>23 | 21.9         | 1.9        | 82<br>83   | 81.7           | 7.1        | 142<br>143 | 141.5          | 12.4         | 202        | 201.2 17.6<br>202.2 17.7 | 262<br>263 | 261.0<br>262.0 |         |
| 23       | 22.9<br>23.9 | 2.0<br>2.1 | 84         | 82.7<br>83.7   | 7.2        | 144        | 142.5<br>149.5 | 12.5<br>12.6 | 203        | 203.2 17.8               | 264        | 268.0          |         |
| 25       | 24.9         | 2.2        | 85         | 84.7           | 7.4        | 145        | 144.4          | 12.6         | 205        | 204.2 17.9               | 265        | 264.0          | 23.1    |
| 26       | 25.9         | 2.3        | 86         | 85.7           | 7.5        | 146        | 145.4          | 12.7         | 206        | 205.2 18.0               | 266        | 265.0          |         |
| 27<br>28 | 26.9         | 2.4        | 87         | 86.7           | 7.6        | 147        | 146.4          | 12.8         | 207<br>208 | ₹06.2 18.0<br>207.2 18.1 | 267<br>268 | 266.0<br>267.0 |         |
| 29       | 27.9<br>28.9 | 2.4        | 88<br>89   | 87.7<br>88.7   | 7.7        | 148<br>149 | 147.4<br>148.4 | 12.9<br>13.0 | 209        | 208.2 18.2               | 269        | 268.0          |         |
| 30       | 29.9         | 2.6        | 90         | 89.7           | 7.8        | 150        | 149.4          | 13.1         | 210        | 209.2 18.3               | 270        | 269.0          |         |
| 31       | 30.9         | 2.7        | 91         | 90.7           | 7.9        | 151        | 150.4          | 13.2         | 211        | 210.2 18.4               | 271        | 270.0          | 23.6    |
| 32       | 31.9         | 2,8        | 92         | 91.6           | 8.0        |            | 151.4          | 13.2         | 212        | 211.2 18.5               | 272        | 271.0          |         |
| 33       | 32.9         | 2.9        | 93         | 92.6           | 8.1        |            | 152.4          | 13.3         | 213        | 212.218.6                | 273        | 272.0          |         |
| 34<br>35 | 33.9<br>34.9 | 3.0<br>3:1 | 94<br>95   | 93.6<br>94.6   | 8.2<br>8.3 |            | 153.4<br>154.4 | 13.4<br>13.5 | 214<br>215 | 213.2 18.7<br>214.2 18.7 | 274<br>275 | 278.6<br>274.0 |         |
| 36       | 35.9         | 3.1        | 96         | 95.6           | 8.4        |            | 155.4          | 13.6         |            | 215.2 18.8               | 276        | 274.9          |         |
| 87       | 36.9         | 3.2        | 97         | 96.6           | 8.5        | 157        | 156.4          | 13.7         | 217        | 216.2 18.9               | 277        | 275.9          | 24.1    |
| 38       | 37.9         | 3.3        | 98         | 97.6           | 8.5        | 158        | 157.4          | 13.8         | 218        | 217.219.0 $218.219.1$    | 278        | 276.9          |         |
| 39<br>40 | 38.9<br>39.8 | 3.4        | 99<br>100  | 98.6<br>99.6   | 8.6        | 159<br>160 | 158.4<br>159.4 | 13.9<br>13.9 | 219<br>220 | 219.219.2                | 279<br>280 | 277.9<br>278.9 |         |
|          |              |            |            | !              |            |            |                |              |            | 220.2 19.3               |            |                |         |
| 41<br>42 | 40.8         | 3.6        | 101<br>102 | 100.6<br>101.6 | 8.8        |            | 160.4<br>161.4 | 14.0<br>14.1 | 221<br>222 | 221.219.3                | 281<br>282 | 279.9<br>280.9 |         |
| 43       | 42.8         | 3.7        |            | 102.6          | 9.0        |            | 162.4          | 14.2         | 223        | 222.2 19.4               | 288        | 281.9          |         |
| 44       | 43.8         | 3.8        | 104        | 103.6          | 9.1        | 164        | 163.4          | 14.3         | 224        | 223.119.5                | 284        | 282.9          | 24.8    |
| 45<br>46 | 44.8<br>45.8 | 3.9        | 105        | 104.6          | 9.2        | 165        | 164.4          | 14.4         | 225<br>226 | 224.1 19.6<br>225.1 19.7 | 285<br>286 | 283.9          |         |
| 47       | 46.8         | 4.0        | 106<br>107 | 105.6          | 9.2        |            | 165.4<br>166.4 | 14.5<br>14.6 | 220        | 226.1 19.8               | 286        | 284.9<br>285.9 |         |
| 48       | 47.8         | 4.2        |            |                | 9.4        |            | 167.4          | 14.6         | 228        | 227.1 19.9               | 288        | 286.9          | 25.1    |
| 49       | 48.8         | 4.3        | 109        | 108.6          | 9.5        | 169        | 168.4          | 14.7         | 229        | 228.1 20.0               | 289        | 257.9          |         |
| 50       | 49.8         | 4.4        | 110        | 109.6          | 9.6        | 170        | 169.4          | 14.8         | 230        | 229.1 20.0               | 290        | 288.9          | 25.3    |
| 51       | 50.8         | 4.4        | 111        | 110.6          | 9.7        |            | 170.3          | 14.9         | 231        | 230.1 20.1               | 291        | 239.9          |         |
| 52<br>53 | 51.8         | 4.5        |            | 111.6<br>112.6 |            |            | 171.3<br>172.5 | 15.0<br>15.1 |            | 231.1 20.2<br>232.1 20.3 |            | 290.9<br>291.9 |         |
| 54       | 52.8<br>53.8 |            |            | 113.6          |            |            | 172.5          | 15.1         |            | 233.1 20.4               | 293<br>294 | 292.9          |         |
| 55       | 54.8         | 4.8        | 115        | 114.6          | 10.0       |            | 174.3          | 15.3         | 235        | 234.1 20.5               | 295        | 293.9          | 25.7    |
| 56       | 55.8         | 4.9        | 116        | 115.6          | 10.1       |            | 175.3          | 15.3         | 236        | 235.1 20.6               | 296        | 294.9          |         |
| 57<br>58 | 56.8         | 5.0<br>5.1 |            | 116.6          |            |            | 176.3          | 15.4         | 237<br>238 | 236.1 20.7<br>237.1 20.7 | 297<br>298 | 295.9<br>296.9 |         |
| 59       | 57.8<br>58.8 | 5.1        |            | 117.6          |            |            | 177.3<br>178.3 | 15.5<br>15.6 | 239        | 238.1 20.8               | 298        | 290.9          |         |
| 60       | 59.8         |            |            | 119.5          |            | 180        | 179.3          | 15.7         |            | 239.1 20.9               | 300        | 298.9          |         |
| Dist.    | Den-         | D.Lat      | Dist.      | Dep.           | D. L.at    | Dist       | Den            | Ď.Lat        | Dist       | Dep. D.lat               | Dist.      | Dep.           | D.Lat   |
|          | Po (         |            |            |                | ati        |            | 5 Degr         |              |            |                          |            | (Dep.          | 27.2.20 |
|          |              |            |            |                |            |            | o neg          | CEU.         |            |                          |            |                |         |

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

|          |              |            |          |                |            | 6            | Degre                   | es.          |            |                          |            |                |              |
|----------|--------------|------------|----------|----------------|------------|--------------|-------------------------|--------------|------------|--------------------------|------------|----------------|--------------|
| Dist.    | D.Lat        | Dep.       | Dist.    | DLat           | Dep.       |              |                         | Dep.         | Dist.      | D.Lat Dep.               | Dist.      | D.L.at         | Dep.         |
| 1        | 1.0          | 0.1        | 61       | 60.7           | 6.4        | 121          | 120.3                   | 12.6         | 181        | 180.0 18.9               |            | 239.7          |              |
| 2        | 2.0          | 0.2        | 62       | 61.7           | 6.5        |              | 121.3                   | 12.8         | 182        | 181.0 19.0               |            | 240.7          |              |
| 3 4      | 3.0<br>4.0   | 0.3        | 63<br>64 | 62.7<br>63.6   | 6.6        |              | 122.3<br>123.3          | 12.9<br>13.0 | 183<br>184 | 182.0 19.1<br>183.0 19.2 | 243<br>244 | 241.7<br>242.7 |              |
| 5        | 5.0          | 0.5        | 65       | 64.6           | 6.8        |              | 124.3                   | 13.1         | 185        | 184.0 19.3               | 245        | 243.7          |              |
| 6        | 6.0          | 0.6        | 66       | 65.6           | 6.9        | 1 <b>2</b> 6 | 125.3                   | 13.2         | 186        | 185.0 19.4               | 246        | 244.7          | 25.7         |
| 7        | 7.0          | 0.7        | 67       | 66.6           | 7.0        |              | 126.3                   | 13.3         | 187        | 186.0 19.5               | 247        | 245.€          |              |
| 8        | 8.0<br>9.0   | 0.8        | 68<br>69 | 67.6<br>68.6   | 7.1        | 128<br>129   | 127.3<br>128.3          | 13.4<br>13.5 | 188<br>189 | 187.0 19.7<br>188.0 19.8 | 248<br>249 | 246.6<br>247.6 |              |
| 9<br>10  | 9.9          | 1.0        | 70       | 69.6           | 7.3        | 130          | 129.3                   | 13.6         | 190        | 189.0 19.9               | 250        | 248.6          |              |
| 11       | 10.9         | 1.1        | 71       | 70.6           | 7.4        | 131          | 130.3                   | 13.7         | 191        | 190.0 20.0               | 251        | 249.6          | 26.2         |
| 12       | 11.9         | 1.3        | 72       | 71.6           | 7.5        |              | 131.3                   | 13.8         | 192        | 190.9 20.1               | 252        | 250.6          |              |
| 13       | 12.9         | 1.4        | 73       | 72.6           | 7.6        |              | 132.3                   | 13.9         | 193        | 191.920.2                |            | 251.6          |              |
| 14<br>15 | 13.9<br>14.9 | 1.5        | 74<br>75 | 73.6<br>74.6   | 7.7        | 134<br>135   | 133.3<br>134.3          | 14.0<br>14.1 | 194<br>195 | 192.9 20.3<br>193.9 20.4 |            | 252.6<br>253.6 |              |
| 16       | 15.9         | 1.7        | 76       | 75.6           |            | 136          | 135.3                   | 14.2         | 196        | 194.9 20.5               |            | 254.6          |              |
| 17       | 16.9         | 1.8        | 77       | 76.6           | 8.0        | 137          | 136.2                   | 14.3         |            | 195.9 20.6               | 257        | 255.6          | 26.9         |
| 18       | 17.9         | 1.9        | 78       | 77.6           |            | 138          | 137.2                   | 14.4         | 198        | 196.9 20.7               |            | 256.6          |              |
| 19<br>20 | 18.9<br>19.9 | 2.0        | 79<br>80 | 78.6<br>79.6   | 8.3        | 139<br>140   | 138.2<br>13 <b>9</b> .2 | 14.5<br>14.6 | 199<br>200 | 197.9 20.8<br>198.9 20.9 |            | 257.6<br>258.6 |              |
|          |              |            |          |                | <u></u>    | <u> </u>     |                         |              |            |                          | ļ——        |                |              |
| 21<br>22 | 20.9<br>21.9 | 2.2        | 81       | 80.6<br>81.6   | 8.5<br>8.6 | 141          | 140.2<br>141.2          | 14.7<br>14.8 | 201        | 199.921.0<br>200.921.1   | 261<br>262 | 259.6<br>260.6 |              |
| 23       | 22.9         |            | 83       | 82.5           |            | 143          | 142.2                   | 14.9         | 203        | 201.921.2                |            | 261.6          |              |
| 24       | 23.9         | 2.5        | 84       | 83.5           | 8.8        | 144          | 143.2                   | 15.1         | 204        | 202.921.3                |            | 262.6          |              |
| 25       | 24.9         | 2.6        | 85       | 84.5           |            | 145          | 144.2                   | 15.2         | 205        | 203.921.4                |            | 263.5          |              |
| 26<br>27 | 25.9<br>26.9 |            | 86<br>87 | 85.5<br>86.5   |            | 146<br>147   | 145.2<br>146.2          | 15.3<br>15.4 | 206<br>207 | 204.9 21.5<br>205.9 21.6 |            | 264.5<br>265.5 |              |
| 28       | 27.8         | . 1        | 88       | 87.5           |            | 148          | 147.2                   | 15.5         | 208        | 206.9 21.7               |            | 266.5          |              |
| 29       | 28.8         |            | 89       | 88.5           | 9.3        | 149          | 148.2                   | 15.6         |            | 207.9 21.8               | 11 -       | 267.5          | 28.1         |
| 30       | 29.8         | 3.1        | 90       | 89.5           | 9.4        | 150          | 149.2                   | 15.7         | 210        | 208.8 22.0               | 270        | 268.5          | 28.2         |
| 31       | 30.8         |            | 91       | 90.5           |            | 151          | 150.2                   | 15.8         | 211        | 209.8 22.1               | 271        | 269.5          |              |
| 32       | 31.8         | 3.3        | 92       | 91.5           |            | 152          | 151.2                   | 15.9         | 212        | 210.8 22.2               |            | 270.5          |              |
| 33<br>34 | 32.8<br>33.8 | 3.4        | 93<br>94 | 92.5           |            | 153<br>154   | 152.2<br>153.2          |              | 213<br>214 | 211.8 22.3<br>212.8 22.4 |            | 271.5<br>272.5 |              |
| 35       | 34.8         |            | 95       | 94.5           |            | 155          | 154.2                   |              |            | 213.8 22.5               |            | 273.5          |              |
| 36       | 35.8         |            | 96       |                | 10.0       | 156          | 155.1                   | 16.3         |            | 214.8 22.6               |            | 274.5          |              |
| 37       | 36.8<br>37.8 | 3.9<br>4.0 | 97       |                | 10.1       | 157          | 156.1                   | 16.4         |            | 215.8 22.7               |            | 275.5          |              |
| 38<br>39 | 38.8         | 4.1        | 98<br>99 |                | 10.2       | 158<br>159   | 157.1<br>158.1          | 16.5<br>16.6 | 218<br>219 | 216.8 22.8<br>217.8 22.9 | 11         | 276.5<br>277.5 |              |
| 40       | 39.8         | 4.2        | 100      |                | 10.5       | 160          | 159.1                   | 16.7         | 220        | 218.8 23.0               |            | 278.5          |              |
| 41       | 40.8         | 4.3        | 101      | 100.4          | 10.6       | 161          | 160.1                   | 16.8         | 221        | 219.8 23.1               | 281        | 279.5          | 29.4         |
| 42       | 41.8         | 4.4        | 102      | 101.4          | 10.7       | 162          | 161.1                   | 16.9         | 222        | 220.8 23.2               | 282        | 280.5          | 29.5         |
| 43       | 42.8         | 4.5        | 103      | 102.4          |            | 163          | 162.1                   | 17.0         |            | 221.8 23.9               |            | 281.4          |              |
| 44<br>45 | 43.8         | 4.6        | 104      | 103.4          |            | 164          | 163.1<br>1 <b>64</b> .1 | 17.1<br>17.2 | 224<br>225 | 222.8 23.4<br>223.8 23.5 |            | 282.4<br>283.4 |              |
| 46       | 45.7         |            | 106      | 105.4          |            | 166          | 165.1                   | 17.4         | 226        | 224.8 23.6               |            | 284.4          | 29.9         |
| 47       | 46.7         | 4.9        | 107      | 106.4          | 11.2       | 167          | 166.1                   | 17.5         | 227        | 225.8 23.7               | 287        | 285.4          | 30.0         |
| 48       | 47.7         |            | 108      | 107.4          |            | 168          | 167.1                   | 17.6         |            | 226.8 23.8               |            | 286.4          |              |
| 49<br>50 | 48.7<br>49.7 | 5.1<br>5.2 | 109      | 108.4<br>109.4 |            | 169<br>170   | 168.1<br>169.1          | 17.7<br>17.8 | 229        | 227.7 23.9<br>228.7 24.0 |            | 287.4<br>288.4 |              |
| 51       | 50.7         | 5.3        | 111      | 110.4          |            | 171          | 170.1                   | 17.9         | 231        | 229.7 24.1               | 291        | 289.4          |              |
| 52       | 51.7         |            |          | 111.4          |            | 172          | 171.1                   |              |            | 230.7 24.9               |            | 290.4          |              |
| 53       | 52.7         | 5.5        | 113      | 112.4          | 11.8       | 178          | 172.1                   | 18.1         | 233        | 231.7 24.4               | 293        | 291.4          | 30.6         |
| 54<br>55 | 59,7         |            |          | 113.4          |            | 174          | 173.0                   |              |            | 232.7 24.5               |            | 292.4          | 30.7<br>20.₽ |
| 55<br>56 | 54.7<br>55.7 | 5.7<br>5.9 | 115      | 114.4          |            | 175<br>176   | 174.0<br>175.0          |              |            | 233.7 24.6<br>254.7 24.7 |            | 293.4<br>294.4 | 30.9         |
| 57       | 56.7         | 6.0        | 117      | 116.4          |            | 177          | 176.0                   |              | 237        | 235.7 24.8               |            | 295.4          | 31.0         |
| 58       | 57.7         | 6.1        | 118      | 117.4          |            | 178          | 177.0                   | 18.6         | 238        | 236.7 24.9               | 298        | 296.4          | 31.1         |
| 59<br>60 | 58.7<br>59.7 | 6.2<br>6.3 | 119      | 118.3<br>119.3 |            | 179<br>180   | 178.0<br>179.0          |              | 239<br>240 | 287.725.0                |            | 297.4<br>298.4 |              |
|          |              |            |          | <u> </u>       |            | ļ            |                         |              | <u>!</u>   | 238.7 25.1               | <b>B</b>   | 1 .1           |              |
| Dist.    | neb.         | n.Tat,     | DIST.    | ι μep.         | D.L.at     |              |                         |              | Dist.      | Dep. Dlat                | " LJist.   | Dep.           |              |
|          |              |            |          |                |            | 84           | Degre                   | ees.         |            |                          |            | , viv          | ·            |

TABLE XIII,

|          |              |                   |            |                |            | 7          | Degre          | es.          | •          |                |       |            |                |              |
|----------|--------------|-------------------|------------|----------------|------------|------------|----------------|--------------|------------|----------------|-------|------------|----------------|--------------|
| Dist.    | D.Dat        | Dep.              | Dist.      | DLat           | Dep.       | Dist.      | D.Lat          | Dep.         | Dist.      | D.Lat          | Dep.  | Dist.      | D. Lat         | Dep.         |
| 1 2      | 1.0          |                   | 61         | 60.5           | 7.4        | 121        | 120.1          | 14.7         | 181        | 179.7          |       | 241        | 239.2          |              |
| 3        | 2.0<br>3.0   |                   | 62         | 61.5           | 7.6        |            | 121.1<br>122.1 | 14.9<br>15.0 | 182<br>183 | 180.6<br>181.6 |       | 242<br>243 | 240.2<br>241.2 |              |
| 4        | 4.0          | 0.5               | 64         | 63.5           | 7.8        |            | 123.1          | 15.1         | 184        | 182.6          |       | 244        | 242.9          |              |
| 5        | 5.0          |                   | 65         | 64.5           | 7.9        |            | 124.1          | 15.2         | 185        | 183.6          | 22.5  | 245        | 243.9          |              |
| 6 7      | 6.0          |                   | 66<br>67   | 65.5           | 8.0<br>8.2 | 126<br>127 | 125.1<br>126.1 | 15.4         | 186        | 184.6          |       | 246        | 244.2          |              |
| 8        | 7.9          | 1.0               | 68         | 67.5           | 8.3        |            | 120.1          | 15.5<br>15.6 | 187        | 185.6<br>186.6 |       | 247<br>248 | 245.2<br>246.2 |              |
| 9        | 8.9          | 1.1               | 69         | 68.5           | 8.4        | 129        | 128.0          | 15.7         | 189        | 187.6          |       | 249        | 247.1          |              |
| 10       | 9.9          | 1.2               | 70         | 69.5           | 8.5        | 130        | 129.0          | 15.8         | 190        | 138.6          | 23.2  | 250        | 248.1          | 30. <b>5</b> |
| 11<br>12 | 10.9         | 1.3               | 71         | 70.5           | 8.7        |            | 130.0          |              | 191        | 189.6          |       | 251        | 249.1          |              |
| 13       | 11.9<br>12.9 | 1.5               | 72 73      | 71.5           | 8.8        | 132<br>133 | 131.0<br>132.0 | 16.1<br>16.2 | 192<br>193 | 190.6<br>191.6 |       | 252<br>253 | 250.1<br>251.1 |              |
| 14       | 13.9         | 1.7               | 74         | 73.4           | 9.0        | 133        | 132.0          | 16.3         | 194        | 192.6          |       | 254        | 252.1          |              |
| 15       | 14.9         | 1.8               | 7.5        | 74.4           | 9.1        | 135        | 134.0          | 16.5         | 195        | 193.5          |       | 255        | 253.1          |              |
| 16<br>17 | 15.9         | 1.9               | 76         | 75.4           | 9.5        | 136        | 135.0          |              | 196        | 194.5          |       | 256        | 254.1          |              |
| 18       | 16.9<br>17.9 | $\frac{2.1}{2.2}$ | 77 78      | 76.4<br>77.4   | 9.4<br>9.5 | 137<br>138 | 136.0<br>137.0 |              | 197        | 195.5<br>196.5 |       | 257<br>258 | 255.1<br>256.1 |              |
| 19       | 18.9         | 2.3               | 79         | 78.4           | 9.6        | 139        | 138.0          | 16.8         | 198        | 195.5          |       |            | 257.1          |              |
| 20       | 19.9         | 2.4               | 80         | 79.4           | 9.7        | 140        | 139.0          |              | 200        | 198.5          |       | 260        | 258.1          |              |
| 21       | 20.8         | 2.6               | 81         | 80.4           | 9:9        | 141        | 139.9          | 17.2         | 201        | 199.5          | 24.5  | 261        | 259.1          | 31.8         |
| 22<br>23 | 21.8         | 2.7               | 82         | 31.4           |            | 142        | 140.9          | 17.3         | 202        | 200.5          |       |            | 260.0          |              |
| 24       | 22.8<br>23.8 | $\frac{2.8}{2.9}$ | 83         | 82.4           |            | 143<br>144 | 141.9<br>142.9 | 17.4<br>17.5 | 203        | 201.5          |       | 263<br>264 | 261.0<br>262.0 |              |
| 25       | 24.8         | 3.0               | 85         | 84.4           |            | 145        | 143.9          | 17.7         |            | 203.5          |       | 265        | 263.0          |              |
| 26       | 25.8         | 3.2               | 86         | 85.4           | 10.5       | . 146      | 144.9          | 17.8         | 206        | 204.5          |       | 266        | 264.0          | 32.4         |
| 27<br>28 | 26.8<br>27.8 | 3.3               | 87         | 86.4           |            | 147        | 145.9          | 17.9         | 207        | 205.5          |       | 267        | 265.0          |              |
| 29       | 28.8         | 3.4               | 88         | 87.3<br>88.3   |            | 148<br>149 | 146.9<br>147.9 | 18.0<br>18.2 | 208<br>209 | 206.4<br>207.4 |       | 268<br>269 | 266.0<br>267.0 |              |
| 30       | 29.8         | 3.7               | 90         | 89.3           |            | 150        | 148.9          |              | 210        | 208.4          |       | 270        | 268.0          |              |
| 31       | 30.8         | 3.8               | 91         | 90.3           |            | 151        | 149.9          | 18.4         | 211        | 209.4          | 25.7  | 271        | 269.0          | 33.0         |
| 32<br>39 | 31.8         | 8.9               | 92         | 91.3           |            | 152        | 150.9          | 18.5         | 212        | 210.4          |       | 272        | 270.0          |              |
| 34       | 32.8<br>33.7 | 4.0               | 93<br>94   | 92.3<br>93.3   |            | 153<br>154 | 151.9<br>152.9 | 18.6<br>18.8 | 213        | 211.4<br>212.4 |       | 273<br>274 | 271.0<br>272.0 |              |
| 85       | 34.7         | 4.3               | 95         | 94.3           |            | 155        | 153.8          | 18.9         | 215        | 213.4          |       | 275        | 273.0          |              |
| 36       | 35.7         | 4.4               | 96         | 95.3           |            | 156        | 154.8          | 19.0         | 216        | 214.4          |       | 276        | 273.9          |              |
| 37<br>38 | 36.7<br>37.7 | 4.5               | 97         | 96.3<br>97.3   |            | 157<br>158 | 155.8<br>156.8 | 19.1<br>19.3 | 217<br>218 | 215.4<br>216.4 |       | 277<br>278 | 274.9<br>275.9 |              |
| 39       | 38.7         | 4.8               | 99         | 98.3           |            | 159        | 157.8          | 19.4         |            | 217.4          |       | 279        | 276.9          |              |
| 40       | 39.7         | 4.9               | 100        | 99.3           | 12.2       | 160        | 158.8          |              | 220        | 218.4          |       | 280        | 277.9          | 34.1         |
| 41       | 40.7         | 5.0               | 101        | 100.2          |            | 161        | 159.8          |              | 221        | 219.4          |       | 281        | 278.9          |              |
| 42<br>43 | 41.7         | 5.1<br>5.2        | 102        | 101.2<br>102.2 |            | 162<br>163 | 160.8<br>161.8 | 19.7         | 222        | 220.3<br>221.3 |       | 282<br>283 | 279.9<br>280.9 |              |
| 44       | 43.7         | 5.4               | 103        | 103.2          |            | 164        | 162.8          | 19.9<br>20.0 | 223<br>224 | 222.3          |       | 284        | 281.9          |              |
| 45       | 44.7         | 5.5               | 105        | 104.3          | 12.8       | 165        | 163.8          | 20.1         | 225        | 223.3          | 27.4  | 285        | 282.9          | 34.7         |
| 46       | 45.7<br>46.6 | 5.6<br>5.7        | 106        | 105.2<br>106.2 |            | 166        | 164.8          | 20.2         | 226        | 224.3          |       | 286        | 283.9<br>284.9 |              |
| 48       | 47.6         | 5.8               | 107        | 107.2          |            | 167<br>168 | 165.8<br>166.7 | 20.4         | 227<br>228 | 225.3<br>226.3 |       | 287<br>288 | 285.9          |              |
| 49       | 48.6         | 6.0               | 109        | 108.2          | 13.3       | 169        | 167.7          | 20.6         | 229        | 227.3          |       | 289        | 286.8          | 35.2         |
| 50       | 49.6         | 6.1               | 110        | 109.2          | 13.4       | 170        | 168.7          | 20.7         | 230        | 228.3          | 28.0  | 290        | 287.8          | 35.3         |
| 51<br>52 | 50.6         | 6.2               | 111        | 110.2          |            | 171        | 169.7          | 20.8         | 231        | 229.3          |       | 291        | 288.8          |              |
| 53       | 51.6<br>52.6 | 6.5               | 112<br>113 | 111.2<br>112.2 |            | 172<br>173 | 170.7<br>171.7 | 21.0<br>21.4 | 232<br>233 | 230.3<br>231.3 |       |            | 289.8<br>290.8 |              |
| 54       | 53.6         | 6.6               | 114        | 113.2          |            |            | 172.7          | 21.2         |            | 232.8          |       | 294        | 291.8          |              |
| 55       | 54.6         | 6.7               | 115        | 114.1          | 14.0       | 175        | 173.7          | 21.3         | 235        | 233.2          | 28.6  | 295        | 292.8          | 36.0         |
| 56<br>57 | 55.6<br>56.6 | 6.8               | 116        | 115.1          |            |            | 174.7          | 21.4         | 236        | 234.2          |       | 296        | 293.8          |              |
| 58       | 56.6<br>57.6 | 7.1               | 117        | 116.1          |            | 177<br>178 | 175.7<br>176.7 | 21.6<br>21.7 | 237<br>238 | 235.2<br>236.2 |       | 297<br>298 | 294.8<br>295.8 |              |
| 59       | 58.6         | 7.2               | 119        | 118.1          |            | 179        | 177.7          | 21.8         | 239        | 237.2          |       | 299        | 296.8          | 36.4         |
| 60       | 59.6         |                   |            | 119.1          |            | 180        | 178.7          | 21.9         | 240        | 238.2          | 29.2  |            | 297.8          |              |
| Dist.    | Dep.         | DLat              | Dist.      | Dep.           | D.Lat      | Dist.      | Dep.           | DLat         | Dist.      | Dep.           | D.lat | Dist.      | Dep.           | D.Lat        |
|          |              |                   |            |                |            | 83         | Degr           | ecs.         |            |                |       |            |                |              |

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

|                  |              |            |          |                |              | 8          | Degree         | :8.          |            |                  |         |             |                | i    |
|------------------|--------------|------------|----------|----------------|--------------|------------|----------------|--------------|------------|------------------|---------|-------------|----------------|------|
| Dist             | D.Lat        | Dep.       | Dist.    | DLat           | Dep.         | Dist.      | DLat           | Dep.         | Dist.      | DLat             | Dep.    | Dist.       | D.Lat          | Dep. |
| 1                | 1.0          | 0.1        | 61       | 60.4           | 8.5          | 121        | 119.8          | 16.8         | .181       | 179.2            | 25.2    | 241         | 238.7          | 33.5 |
| 2                | 2.0          | 0.3        | 62       | 61.4           | 8.6          | 122        | 120.8          | 17.0         |            | 180.2            |         | 242         | 239.6          |      |
| 8                | 3.0          | 0.4        | 63       | 62.4           | 8.8          | 123        | 121.8          | 17.1         | 188        | 181.2            | 25.5    | 243         | 240.6          | 33.8 |
| 4                | 4.0          | 1          | 64       | 63.4           | 8.9          | 124        | 122.8          | 17.3         | 184        | 182.2            |         | 244         | 241.6          |      |
| 5                | 5.0          | 0.7        | 65       | 64.4           | 9.0          | 125        | 123.8          | 17.4         | 185        | 183.2            |         | 245         | 242.6          |      |
| 6                | 5.9          | 0.8        | 66       | 65.4           | 9.2          | 126        | 124.8          | 17.5         | 186        | 184.2            |         | 246         | 243.6          |      |
| 7                | 6.9          | 1.0        | 67       | 66.3           | 9.3          | 127        | 125.8          | 17.7         | 187        | 185.2            |         | 247         | 244.6          |      |
| 9                | 7.9<br>8.9   | 1.1        | 68       | 67.3           | 9.5          | 128        | 126.8          | 17.8         | 188        | 186.2            |         | 248         | 245.6<br>246.6 |      |
| 10               | 9.9          | 1.3        | 69<br>70 | 68.3<br>69.3   | 9.6<br>9.7   | 129<br>130 | 127.7<br>128.7 | 18.0<br>18.1 | 189<br>190 | 187.2<br>188.2   |         | 249<br>250  | 247.6          |      |
|                  |              |            |          |                | 3.1          | 130        |                | 10.1         | 130        |                  | -       |             | <del></del>    | :    |
| 11               | 10.9         | 1.5        | 71       | 70.3           | 9.9          | 131        | 129.7          | 18.2         | 191        | 189.1            |         | 251         | 248.6          |      |
| 12<br>13         | 11.9         | 1.7        | 72       | 71.3           | 10.0         | 132        | 130.7          | 18.4         | 192        | 190.1            |         | 252         | 249.5          |      |
| 14               | 12.9<br>13.9 | 1.8        | 73       | 72.3<br>73.3   | 10.2         | 133        | 131.7          | 18.5         | 193        | 191.1<br>192.1   |         | <b>25</b> 3 | 250.5<br>251.5 |      |
| 15               | 14.9         | 1.9<br>2.1 | 74<br>75 | 74.3           | 10.3         | 134<br>135 | 132.7<br>133.7 | 18.6         | 194<br>195 | 193.1            |         | 254<br>255  | 252.5          |      |
| 16               | 15.8         | 2.2        | 76       | 75.3           | 10.4<br>10.6 | 136        | 134.7          | 18.8<br>18.9 | 196        | 194.1            |         | 256         | 253.5          |      |
| 17               | 16.8         | 2.4        | 77       | 76.3           | 10.7         | 137        | 135.7          | 19.1         | 197        | 195.1            |         | 257         | 254.5          |      |
| 18               | 17.8         | 2.5        | 78       | 77.2           | 10.9         | 138        | 136.7          | 19.2         | 198        | 196.1            |         | 258         | 255.5          |      |
| 19               | 18.8         | 2.6        | 79       | 78.2           | 11.0         | 139        | 137.7          | 19.3         | 199        | 197.1            |         | 259         | 256.5          |      |
| <b>,20</b>       | 19.8         | 2.8        | 80       | 79.2           | 11.1         | 140        | 138.6          | 19.5         | 200        | 198.1            |         | 260         | 257.5          |      |
| 21               | 20.3         | 2.9        | 81       | 80.2           | 11.3         | 141        | 139.6          | 19.6         | 201        | 199.0            | 28.0    | 261         | 258.5          | 36.3 |
| 22               | 21.8         | 3.1        | 182      | 81.2           | 11.4         | 142        | 140.6          | 19.8         | 202        | 200.0            |         | 262         | 259.5          | 36.5 |
| 23               | 22.8         | 3.2        | 83       | 82.2           | 11.6         | 143        | 141.6          | 19.9         | 203        | 201 0            | 28.3    | 263         | 260.4          |      |
| 24               | 23.8         | 3.3        | 84       | 83.2           | 11.7         | 144        | 142.6          | 20.0         | 204        | 202.0            | 28.4    | 264         | 261.4          | 36.7 |
| 25               | 24.8         | 3.5        | 85       | 84.2           | 11.8         | 145        | 143.6          | 20.2         | 205        | 203.0            | 28.5    | 265         | 262.4          |      |
| 26               | 25.7         | 3.6        | 86       | 85.2           | 12.0         | 146        | 144.6          | 20.3         | 206        | 204.0            |         | 266         | 263.4          |      |
| 27               | 26.7         | 3.8        | 87       | 86.2           | 12.1         | 147        | 145.6          | 20.5         | 207        | 205.0            |         | 267         | 264.4          |      |
| 28               | 27.7         | 3.9        | 88       | 87.1           | 12.2         | 148        | 146.6          | 20.6         | 208        | 206.0            |         | 268         | 265.4          | 97.4 |
| 29<br>30         | 28.7<br>29.7 | 4.0        | 89       | 88.1           | 12.4         | 149        | 147.5          | 20.7         | 209        | 207.0<br>208.0   |         | 269<br>270  | 266.4<br>267.4 | 97.6 |
|                  | 29.1         | 4.2        | 90       | 89.1           | 12.5         | 150        | 148.5          | 20.9         | 210        | <u> </u>         |         | 270         |                |      |
| 31               | 30.7         | 4.3        | 91       | 90.1           | 12 7         | 151        | 149.5          | 21.0         | 211        | 208.9            |         | 271         | 268.4          | 37.7 |
| 32               | 31.7         | 4.5        | 92       | 91.1           | 12.8         | 152        | 150.5          | 21.2         | 212        | 209.9            |         | 272         | 269.4          | 37.9 |
| 33               | 32.7         | 4.6        | 93       | 92.1           | 12.9         | 153        | 151.5          | 21.3         | 213        | 210.9            |         | 273         | 270.3          | 00.0 |
| <b>34</b><br>35  | 33.7         | 4.7        | 94       | 93 1           | 13.1         | 154        | 152.5          | 21.4         | 214        | 211.9            |         | 274         | 271.3<br>272.3 | 30.1 |
| <b>3</b> 6       | 34.7<br>35.6 | 4.9<br>5.0 | 95<br>96 | 94.1<br>95.1   | 13 2         | 155        | 153.5          | 21.6         | 215<br>216 | $212.9 \\ 213.9$ |         | 275<br>276  | 272.3<br>273.3 | 38.4 |
| 87               | 36.6         | 5.1        | 97       | 96.1           | 13.4<br>13.5 | 156<br>157 | 154.5<br>155.5 | 21.7<br>21.9 | 217        | 214.9            |         | 277         | 274.5          | S8.6 |
| 38               | 37.6         | 5.3        | 98       | 97.0           | 13.6         | 158        | 156.5          | 22.0         | 218        | 215.9            |         | 278         | 275.9          |      |
| <b>39</b> '      | 38.6         | 5.4        | 99       | 98.0           | 13.8         | 159        | 157.5          | 22.1         | 219        | 216.9            |         | 279         | 276.3          |      |
| 40               | 39.6         | 5.6        | 100      | 99.0           | 13.9         | 160        | 158.4          | 22.3         | 220        | 217.9            |         | 280         | 277.3          |      |
| '41              | 40.6         | 5.7        | 101      | 100.0          | 14.1         | 161        | 159.4          | 22.4         | 221        | 218.8            | 30.8    | 281         | 278.3          | 39.1 |
| 42               | 41.6         | 5.8        | 102      | 101.0          | 14.1         | 162        | 160.4          | 22.4         | 222        | 219.8            |         | 282         | 279.3          | 39.2 |
| 43               | 42.6         | 6.0        | 103      | 102.0          | 14.5         | 163        | 161.4          | 22.7         | 223        | 220.8            |         | 283         | 280.2          | 39.4 |
| 44               | 43.6         | 6.1        | 104      |                | 14.5         | 164        | 162.4          | 22.8         | 224        | 221.8            |         | 284         | 281.2          | 39.5 |
| 45               | 44.6         | 6.3        | 105      | 104.0          | 14.6         | 165        | 163.4          | 23.0         | 225        | 222.8            |         | 285         | 282.2          |      |
| 46               | 45.6         | 6.4        | 106      | 105 0          | 14.8         | 166        | 164.4          | 23.1         | 226        | 223.8            | 31.5    | 286         | 283.2          | 39.8 |
| 47               | 46.5         | 6.5        | 107      | 106.0          | 14.9         | 167        | 165.4          | 23.2         | 227        | 224.8            |         | 287         | 284.2          | 39.9 |
| 48               | 47.5         | 6.7        | 108      | 106.9          | 15.0         | 168        | 166.4          | 23.4         | 228        | 225.8            |         | 288         | 285.2          |      |
| 49               | 48.5         | 6.8        | 109      | 107.9          | 15.2         | 169        | 167.4          | 23.5         | 229        | 226.8            |         | 289         | 286.2          |      |
| 50               | 49.5         | 7.0        | 110      | 108.9          | 15.3         | 170        | 168.3          | 23.7         | 230        | 227.8            |         | 290         | 287.2          |      |
| 51               | 50.5         | 7.1        | 111      | 109.9          | 15.4         | 171        | 169.3          | 23.8         | 231        | 228.8            |         | 291         | 288 2          | 40.5 |
| 52               | 51.5         | 7.2        | 112      | 110.9          | 15.6         |            | 170.3          | 23.9         | 232        | 229.7            | 11      | 292         | 289.2          | 40.6 |
| 53               | 52.5         |            |          | 111.9          |              |            | 171.9          | 24.1         |            | 230.7            |         | 293         | 290.1          | 40.0 |
| 54<br>55         | 53.5         |            |          | 112.9          |              |            | 172.3          | 24.2         |            | 281.7            |         |             | 291.1          |      |
| 55<br><b>5</b> 6 | 54.5         |            |          | 113.9          |              |            | 173.3          |              |            | 232.7            |         |             | 292.1<br>293.1 |      |
| 57               | 55.5<br>56.4 |            |          | 114.9          | 16.1         | 176        | 174.3          |              | •          | 233.7<br>234.7   |         | 296<br>297  | 293.1<br>294.1 | 41.3 |
| 58               | 57.4         |            |          | 115.9<br>116.9 |              | 177<br>178 | 175.3<br>176.3 |              |            | 235.7            |         | 298         | 295.1          | 41.5 |
| 59               | 58.4         |            |          | 117.8          |              | 179        | 177.3          |              |            | 236.7            |         | 299         | 296.1          | 41.6 |
| 60               | 59.4         |            |          | 118.8          |              |            | 178.2          |              |            | 237.7            |         | 300         | 297-1          | 41 8 |
| Dist.            | Den          | DI         |          |                | D.Lat        |            |                |              |            |                  |         | Die         |                |      |
| 2100.            | Dep.         | I/ALL      | · Disc.  | Dep.           | T-T-4E.      |            |                |              | AMSC.      | Dep.             | Josef ! | DISC        | 1 Deb.         |      |
| <u>.</u>         |              |            |          |                |              | 8          | 2 Degr         | ces.         |            |                  |         |             |                |      |

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

| Dist D.Lat   Dep.   Dist   D.Lat   Dep.   D.Lat  |       |       |       |          |        |          | 9     | Degre | es.     |        |       |       |             |        |        |
|--|-------|-------|-------|----------|--------|----------|-------|-------|---------|--------|-------|-------|-------------|--------|--------|
| 2         2         0         0.3         6         26         21         9.9         122         120.5[9.1]         182         17.8         28.5         242         299.0[37.9]         20         44         4.0         0.6         64         62.2         9.9         123         125.5[9.1]         183         180.7         28.6         244         241.0[38.2]         245         240.0[38.0]         245         240.0[38.0]         245         244.0[38.2]         246         243.0[38.5]         247         248.0[38.5]         247         244.0[38.6]         25.9         18.7         18.7         28.9         245         244.0[38.6]         26.8         18.7         19.1         246         244.0[38.6]         26.8         18.7         19.1         244.0[38.6]         26.9         18.1         18.1         18.2         18.2         18.7         29.5         244         244.9         28.5         18.7         29.9         242         244.9         28.6         24.9         244.9         244.9         28.8         18.7         29.9         244         244.9         245.9         29.0         245.9         247.9         29.0         245.9         245.9         245.9         245.9         245.9         245.9<   | Dist. | D.Lat | Dep.  | Dist.    | D.Lat  | Dep.     | Dist. | D.Lat | Dep.    | Dist.  | D.Lat | Dep.  | Dist.       | D.Lat  | Dep.   |
| 3         3         0         0         6         6         22         10         123         121,519.9         18         180.7         28.6         244         240,038.0         44         40.0         6         64         22         10.0         125         125,519.6         185         182.7         28.8         94         241,038.2         248         28.8         244         241,038.2         28.8         24         241,038.2         28.8         24.9         28.8         24.9         28.8         28.8         24.9         28.8         28.8         21.1         6         66.7         66.2         10.5         127         124.4         19.9         18.8         7.9         2.9         24.9         24.8         24.9         28.8         9.8         9.8         1.1         19.9         69.8         20.0         19.9         18.7         29.4         24.9  |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 4         0         0         6         64         62         91         0         124         125         191         124         125         191         185         182         28         94         244         024         038         6         55         90         99         96         65         62         10.5         192         187         184         78         99         94         244         08.0         88         91         189         187         184         79         92         244         08.0         88         91         189         187         184         294         244         98.8         18.1         187         99.6         249         244         98.9         18         18.1         18         18         18         18         79         96         245         98.9         91         18<   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 5 4.9 0.8   65 64.2   10.2   125   129.5   19.6   185   182.7   28.9   245   242.0   38.3   57.7   6.9   1.1   67   66.2   10.3   127   126.1   19.9   187   184.7   29.3   247   244.0   38.6   87.9   1.3   68   67.9   10.6   127   128   124.2   129.2   128   184.7   29.3   247   244.0   38.6   89   8.9   1.4   69   68.2   10.8   129   127.4   20.2   189   186.7   29.6   249   245.9   39.0   10   9.9   1.6   70   69.1   11.0   190   128.4   20.2   189   186.7   29.6   249   245.9   39.0   11   10.9   1.7   70.1   11.1   131   129.4   20.5   191   188.6   29.9   251   247.9   39.0   121   11.4   131   129.4   20.6   192   189.6   30.0   252   248.9   39.4   131   128.8   22.0   73   72.1   11.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131   131.4   131.4   131   131.4   131.4   131.4   131   131.4   13 |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 6 6 5. 9 0. 9 66 65. 2 10. 3 126 124. 419. 7 186 183. 7 29. 1 246 283.0 88.5. 6 8 7. 9 1. 1 67 66. 9 10. 5 127 125. 419. 9 187 184. 7 29.3 247 244.0 85. 6 8 7. 9 1. 1 66. 66. 2 10. 5 127 125. 419. 9 187 184. 7 29. 3 247 244.0 88. 8 9 8. 9 1. 4 69 68. 2 10. 8 129 137. 420. 0 188 185. 7 29. 4 248 244. 918. 8 9 1. 4 69 68. 2 10. 8 129 137. 420. 0 188 185. 7 29. 4 248 244. 918. 8 9 1. 4 69 68. 2 10. 8 129 137. 420. 0 189 186. 7 29. 6 246. 9 39. 1 11 10. 9 1. 7 17 10. 1 11. 1 131 129. 4 20. 5 191 188. 6 29. 9 25 248. 9 39. 1 12 11. 9 1. 9 72 71. 1 11. 5 13 12 10. 4 20. 5 191 188. 6 29. 9 25 248. 9 39. 6 18 18 18 2. 8 2. 7 7 73. 1 11. 6 134 132 130. 4 20. 8 193 190. 6 30. 2 255 249. 9 39. 6 18 18 18 2. 8 2. 7 7 7 75. 1 11. 6 134 132 130. 4 20. 8 193 190. 6 30. 2 255 249. 9 39. 6 16 15. 8 2. 5 7 6 75. 1 11. 9 136 143. 2 12. 0 124 191. 6 30. 8 257 253. 8 40. 2 17 17 16. 8 2. 7 7 76. 1 12. 0 137 185. 3 21. 4 197 194. 6 30. 8 257 253. 8 40. 2 19 18. 8 3. 0 79 78. 0 12. 4 139 137. 5 21. 6 199 195. 6 30. 7 256 252. 8 40. 9 18. 8 30. 7 9 78. 0 12. 4 139 137. 5 21. 6 199 195. 6 31. 0 258 254. 8 40. 4 199 18. 8 3. 0 79 78. 0 12. 5 140 188. 9 21. 6 199. 5 31. 1 258 254. 8 40. 4 199. 8 199. 8 199. 6 199. 5 10. 1258 254. 8 40. 4 199. 199. 8 199.  |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 7 6.9 1.1 67 66.2 10.5 127 128 126.4 19.9 187 184.7 29.3 247 244.0   S.6. 8 9 8.9 1.4 69 68.2 10.8 129 127.4 20.2 188 186.7 29.4 248 244.9   S.9. 0 10 9.9 1.6 70 69.1 11.0 130 128.4 20.3 190 187.7 29.6 246.9   S.1. 11  |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 9 8.9 1.4 69 68.2 10.8 129 127.4 20.2 189 186.7 29.6 249 245.9 30.1 11 10.9 1.7 71 70.1 11.1 131 129.4 20.5 191 188.6 29.9 251 247.9 39.3 12 11.9 1.9 72 71.1 11.3 132 130.4 20.6 192 189.6 30.0 252 248.9 39.4 13 12.8 2.0 73 72.1 11.4 133 131.4 20.8 193 190.6 30.2 252 248.9 39.4 14 13.8 2.2 74 75.1 11.6 134 182.4 21.0 194 191.6 30.3 254 250.9 39.7 15 14.8 9.3 75 74.1 11.7 135 133.9 21.1 195 192.6 30.5 255 251.9 39.9 16 15.8 2.5 76 75.1 11.9 136 134.3 21.1 195 192.6 30.5 255 251.9 39.7 18 17.8 2.8 78 77.0 12.2 138 136.3 21.6 198 195.6 30.0 258 248.0 40.0 18 17.8 2.8 78 77.0 12.2 138 136.3 21.6 198 195.6 31.0 258 254.8 40.4 19 18.8 3.0 79 78.0 12.4 139 197.3 21.7 199 196.5 31.1 259 255.8 40.5 19 18.8 3.0 79 78.0 12.4 139 197.3 21.7 199 196.5 31.1 259 255.8 40.5 19 19.8 3.1 80 79.0 12.5 140 188.5 21.6 198 195.6 31.0 258 254.8 40.2 21 20.7 3.5 81 80.0 12.7 141 139.3 22.1 201 198.5 31.4 261 267.8 40.8 22 21.7 3.4 82 81.0 12.8 142 140.3 22.2 20 199.5 31.8 263 263.8 41.0 23 22.7 3.8 84 83.0 13.0 143 141.2 22.4 203 200.5 31.8 263 263.8 41.0 24 23.7 3.8 84 83.0 13.1 144 142.9 22.5 204 201.5 31.9 264 260.7 41.3 25 24.7 3.9 85 84.0 13.5 146 144.9 22.8 206 203.5 32.2 266 262.7 41.6 26 25.7 4.1 86 84.9 13.5 146 144.9 22.8 206 203.5 32.2 266 262.7 41.6 27 26.7 4.7 90 88.9 14.1 150 148.2 23.5 210 207.4 32.9 270 266.7 42.2 28 27.7 4.4 88 86.9 13.8 148 146.2 23.2 208 205.4 32.5 268 267.7 41.9 29 28.6 4.7 90 88.9 14.1 150 148.2 23.5 210 207.4 32.9 270 266.7 42.2 31 30.6 4.8 91 89.9 14.2 151 149.1 23.6 211 204.3 33.0 277 272.6 43.2 31 30.6 5.5 99 93.8 14.9 155 153.1 124.9 191.2 13.3 3.8 277 290.6 205.7 44.6 33 32.6 5.2 94.7 3.8 14.9 155 153.1 154.9 21.9 12.1 33.3 3.8 277 290.6 44.7 41.9 35 31.6 5.5 99 93 81.9 14.5 153 151.1 23.9 213 20.4 33.3 272 280.6 262.7 41.6 35 31.6 5.6 10.9 10.7 16.0 162 160.0 25.5 222 22.9 22.9 3.5 1.8 29.9 29.6 44.7 41.9 29.8 26.6 5.8 99 39.8 14.1 150 148.2 25.5 22.2 22.2 25.5 22.2 25.5 24.7 32.5 44.6 3.5 39.8 34.6 5.5 99 93.8 14.9 155 153.1 24.9 21.9 12.1 3.3 3.8 27.9 27.5 643.2 37.5 64.9 3.8 34.9 34.9 34. |       |       |       |          |        |          | 1     |       |         | : :    |       |       |             |        |        |
| 10   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 11   10.9   1.7   71   70.1   11.1   131   129.4   20.5   191   188.6   29.9   251   247.9   39.5     12   11.9   1.9   72   71.1   11.3   132   130.4   20.6   192   189.6   30.0   252   248.9   39.4     13   12.8   2.0   73   72.1   11.4   133   131.4   20.8   193   190.6   30.0   252   248.9   39.4     14   13.8   2.2   74   73.1   11.6   194   132.4   21.0   194   191.6   30.3   254   250.9   39.7     15   14.8   2.3   75   74.1   11.7   135   133.3   21.1   195   192.6   30.5   255   251.9   19.9     16   15.8   2.5   76   75.1   11.9   136   134.9   21.3   196   193.6   30.7   256   252.8   40.0     17   16.8   2.7   77   76.1   12.0   137   135.3   21.4   197   194.6   30.8   257   233.8   40.2     19   18.8   3.0   79   78.0   12.4   139   137.9   21.6   198   195.6   31.0   258   254.8   40.4     19   18.8   3.0   79   78.0   12.4   139   137.9   21.7   199   196.5   31.1   259   255.8   40.5     19   18.8   3.0   79   78.0   12.4   139   137.9   21.7   199   196.5   31.1   259   255.8   40.5     21   20.7   3.3   81   80.0   12.7   141   139.9   22.1   201   198.5   31.4   261   257.8   40.8     22   21.7   3.4   82   81.0   12.8   142   140.9   22.2   202   199.5   31.6   262   258.8   41.0     23   22.7   3.8   84   83.0   13.1   144   149.9   22.5   204   201.5   31.9   266   268.0     24   23.7   3.8   84   83.0   13.1   144   149.2   22.5   204   201.5   31.9   266   266.7   41.5     25   24.7   3.9   85   84.0   13.3   145   143.9   22.7   205   204.5   31.9   266   262.7   41.6     25   26.7   4.1   86   84.9   13.5   146   144.2   22.8   306   203.5   32.2   266   262.7   41.6     25   26.7   4.1   86   84.9   13.5   146   144.2   22.8   306   203.5   32.2   266   262.7   41.6     26   25.7   4.1   86   84.9   13.5   149   149.1   23.6   211   208.4   33.0   271   267   267   741.5     27   26.7   4.2   87   88   88   91   88   91   14.9   147.2   23.3   209   206.4   32.7   268   268   267   741.5     28   27.7   4.4   88   88   89   19.8   14.7   150   148.2   23.9   23.2   201.3   31.9   2   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 12   11.9   1.9   72   71.1   11.3   132   130.4   20.6   132   189.6   30.0   252   248.9   39.4     13   13.8   2.2   74   73.1   11.6   134   132.4   21.0   194   191.6   30.5   255   249.9   93.6     14   13.8   2.2   74   73.1   11.6   134   132.4   21.0   194   191.6   30.5   255   251.9   99.5     15   14.8   2.3   75   74.1   11.7   135   133.3   21.1   195   193.6   30.5   255   251.9   99.5     15   15.8   2.5   76   75.1   11.9   136   134.9   21.1   195   193.6   30.5   255   251.9   99.9     16   15.8   2.7   77   76.1   12.0   137   135.3   21.4   197   194.6   30.8   257   252.8   40.0     17   16.8   2.7   77   76.1   12.0   137   135.3   21.6   198   195.6   31.0   255   254.8   40.4     19   18.8   3.0   79   78.0   12.4   139   137.3   21.6   198   195.6   31.0   255   254.8   40.4     19   18.8   3.0   79   78.0   12.4   139   137.3   21.7   199   196.5   31.1   259   255.8   40.5     21   20.7   3.3   81   80.0   12.7   141   139.9   22.1   201   198.5   31.4   261   257.8   40.8     22   21.7   3.4   82   81.0   12.8   142   140.9   22.4   203   20.5   31.8   260   256.8   40.7     22   21.7   3.6   83   82.0   13.0   143   141.2   22.4   203   20.5   31.8   263   259.8   841.0     24   23.7   3.8   84   83.0   33.1   144   142.9   29.5   204   201.5   31.9   266   266.8     25   24.7   3.9   85   84.0   13.3   145   142.2   22.8   206   203.5   31.9   266   266.7     26   25.7   4.1   86   84.9   13.5   146   144.2   22.8   206   203.5   32.2   266   262.7   41.6     25   25.7   4.1   86   84.9   13.5   146   144.2   22.8   206   203.5   32.2   266   262.7   41.6     26   25.7   4.1   86   84.9   13.5   146   144.2   22.8   206   203.5   32.2   266   262.7   41.6     27   26.7   4.2   87   88.9   14.7   154   152.1   24.1   21.4   21.4   33.5   272   266.7   267.7   41.5     28   27.7   4.1   86   84.9   13.5   146   147.2   23.3   209   206.4   32.7   266   266.7   41.5     29   28.6   4.5   89   87.9   13.9   149   147.2   23.3   209   206.4   32.7   266   266.7   41.5     20   20   2   | 10    | 9.9   | 1.6   |          | 69.1   |          | 130   | 128.4 | 20.3    |        |       |       |             |        |        |
| 18   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 14 13.8 2.2 74 75.1 11.6 134 132.4 21.0 194 191.6 30.3 254 250.9 [39.7] 16 15.8 2.5 76 76 75.1 11.9 136 134.3 21.3 196 193.6 30.7 256 252.8 40.0 17 16.8 2.7 77 76.1 12.0 137 135.3 21.4 197 194.6 30.8 257 252.8 40.0 19 18 17.8 28 78 77.0 12.2 138 136.3 21.6 198 195.6 31.0 255 254.8 40.4 199 181.8 3.0 79 78.0 12.4 139 197.3 21.6 198 195.6 31.0 255 254.8 40.4 199 181.8 31.8 30 79 78.0 12.4 139 187.3 21.7 199 196.5 31.1 259 255.8 40.5 20 19.8 31. 80 79.0 12.5 140 138.9 31.9 200 197.5 31.3 260 256.8 40.7 12.2 12.7 3.4 82 81.0 12.8 142 140.3 22.2 202 199.5 31.6 262 256.8 40.7 12.2 22.7 3.6 83 82.0 13.0 143 141.2 22.4 203 200.5 31.8 263 259.8 41.1 24 23.7 3.8 84 83.0 13.1 144 142.2 22.5 204 201.5 31.9 264 260.7 41.5 25 24.7 3.9 85 84.0 13.3 145 143.2 22.7 205 202.5 32.1 255 261.7 41.5 25 25.7 14.8 68.4 91 33.5 146 144.2 22.8 206 203.5 32.2 266 262.7 41.5 25 25.7 14.8 88.9 13.9 13.9 149 147.2 23.3 209 204.5 31.8 266 256.7 41.2 87 85.9 13.6 147 145.2 23.0 207 204.5 32.4 267 263.7 41.5 29 28.6 4.5 89 87.9 13.9 14.9 147.2 23.3 209 204.4 33.0 27 266.7 42.2 31.3 31.6 5.0 92 90.9 14.2 150 148.2 23.5 200.5 31.8 266 256.7 42.1 36 31.3 145 144 142.2 21.5 23.0 205.5 31.8 266 256.7 42.1 36 31.3 145 145.2 23.0 207 204.5 32.4 267 263.7 41.5 29 28.6 6.5 2 39 3 91.9 14.5 153 148 147.2 23.3 209 206.4 32.7 266.7 262.7 41.6 27 266.7 42.2 28 206 257.8 40.8 20.1 26.7 41.5 29 28.6 6.5 2 93 91.9 14.5 153 151.1 23.9 206.4 33.0 271 266.7 42.2 31.6 5.6 29 29.9 14.5 153 151.1 23.9 21.2 209.4 33.2 272 266.7 42.2 31.6 5.6 29 29.9 14.5 153 151.1 23.9 21.2 209.4 33.2 272 266.7 42.2 31.6 33.6 25.2 26.5 265.2 33.1 265 266.2 36.7 42.2 31.6 36.5 3.9 49.8 15.6 16.0 158.0 25.0 22.0 21.7 3.4 4.2 30.9 272 266.7 42.2 31.6 31.5 31.5 31.5 31.5 31.5 31.5 31.5 31.5   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 16 14.8 2.3 75 74.1 11.7 135 133.9 21.1 195 192.6 30.5 255 255 251.9 89.9 17 16.8 2.7 77 76.1 12.0 137 135.3 21.4 197 194.6 30.8 257 253.8 40.2 18 17.8 2.8 78 77.0 12.2 198 136.3 21.4 197 194.6 30.8 257 253.8 40.2 19 18.8 3.0 79.7 8.0 12.4 139 137.9 21.7 199 196.5 31.1 259 255.8 40.6 20 19.8 3.1 80 79.0 12.5 140 138.8 21.9 200 197.5 31.3 260 256.8 40.7 21 20.7 3.3 81 80.0 79.0 12.5 140 138.8 21.9 200 197.5 31.3 260 256.8 40.5 22 21.7 3.4 82 81.0 12.8 142 140.9 22.1 201 198.5 31.4 261 257.8 40.8 23 22.7 3.6 83 82.0 13.0 143 141.2 22.4 203 200.5 31.8 265 258.8 41.0 23 22.7 3.6 83 82.0 13.0 143 141.2 22.4 203 200.5 31.8 265 258.8 41.0 23 22.7 3.6 83 84.0 13.3 145 143.2 22.7 255 20.2 199.5 31.8 266 269.7 41.5 26 25.7 4.1 86 84.9 13.5 147 145.2 23.0 27 20.5 32.1 265 261.7 41.5 26 25.7 4.1 88 86.9 13.6 147 145.2 23.0 27 20.5 32.1 265 261.7 41.5 28 27.7 4.4 88 86.9 13.8 148 146.2 23.2 200 200 20.5 32.1 266 262.7 41.6 28 29 28.6 4.5 89 38.9 14.1 150 148.2 23.5 200 200.4 32.5 32.2 266 262.7 41.8 30 29.6 4.7 90 88.9 14.1 150 148.2 23.5 200 207.4 32.5 32.7 266.7 42.2 23.0 29.6 4.7 90 88.9 14.1 150 148.2 23.5 200 207.4 32.7 209 266.7 42.2 23.0 29.6 4.7 90 88.9 14.1 150 148.2 23.5 200 207.4 32.7 209 266.7 42.2 23.0 29.6 4.7 90 88.9 14.1 150 148.2 23.5 200 207.4 32.9 270 266.7 42.2 23.0 29.6 4.7 90 88.9 14.1 150 148.2 23.5 200 207.4 32.9 370 266.7 42.2 33.0 39.9 14.5 153 153.1 24.2 215 212.4 33.6 27.7 273.64.9 30 30.9 31.9 14.5 153 153.1 24.2 215 212.4 33.6 277 273.64.9 30 32.9 32.8 44.9 35.5 14 |       |       |       |          |        |          |       |       | 1       |        |       |       |             |        |        |
| 17   |       |       |       |          |        |          | t     |       |         | 4      | 1     |       |             |        |        |
| 18   | 16    |       |       |          |        |          |       |       |         | 196    | 193.6 | 30.7  |             |        |        |
| 19   18   8   3   0   79   78   0   12   4   139   137   32   1.7   199   196   5   31   3   259   255   840   5   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 90   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 21 20.7 3.3 8 81 80.0 12.7 141 139.8 22.1 201 198.5 31.4 261 257.8 40.8 22 21.7 3.4 82 81.0 12.8 142 140.8 92.2 209 199.5 31.6 262 258.8 41.0 23 22.7 3.8 84 83.0 13.1 144 142.9 22.5 204 201.5 31.8 263 259.8 41.1 24 23.7 3.8 84 83.0 13.1 144 142.9 22.5 204 201.5 31.9 264 260.7 41.5 25 24.7 3.9 85 84.0 13.3 1445 143.9 22.7 205 202.5 32.1 265 261.7 41.5 26 257.7 4.1 86 84.9 13.5 146 144.9 22.8 206 203.5 32.4 265 262.7 41.6 27 26.7 4.2 87 85.9 13.6 147 145.2 23.0 27 204.5 32.4 267 263.7 41.8 28 27.7 4.4 88 86.9 13.8 146 147.9 23.8 206 203.5 32.4 267 263.7 41.8 29 28.6 4.5 89 87.9 13.9 149 147.2 23.3 209 206.4 32.7 266 265.7 41.1 30 29.6 4.5 89 87.9 13.9 149 147.2 23.3 209 206.4 32.7 266 265.7 42.1 30 29.6 4.5 89 31.4 150 148.2 23.5 210 207.4 32.9 270 266.7 42.2 31 30.6 4.8 91 89.9 14.1 150 148.2 23.5 210 207.4 32.9 270 266.7 42.2 31 30.6 4.8 91 89.9 14.2 151 149.1 23.6 211 208.4 33.0 271 267.7 42.4 32 33 32.6 5.2 93 91.9 14.5 153 151.1 23.9 213 20.4 33.3 273 266.6 42.7 34.6 33 32.6 5.2 93 91.9 14.5 153 151.1 23.9 213 210.4 33.3 273 266.6 42.7 34.6 35.5 34.6 5.5 95 38.8 14.9 155 153.1 24.9 213 210.4 33.3 273 266.6 42.7 34.6 35.5 34.6 5.5 95 38.8 14.9 155 153.1 24.9 213 210.4 33.5 274 270.6 42.9 35.5 34.6 5.5 95 83.8 14.9 155 153.1 24.9 213 210.4 33.5 277 277.6 43.9 35.3 37.6 5.6 96 94.8 15.0 156 154.1 24.4 21.1 43.5 5.7 17.6 43.0 39.5 6.1 99 97.8 15.5 159 157.0 24.9 219 216.3 34.3 279 275.6 43.8 37.5 5.9 98 6.8 15.5 159 157.0 24.9 219 216.3 34.3 279 275.6 43.8 37.5 5.9 98 6.8 15.5 159 157.0 24.9 219 216.3 34.3 279 275.6 43.8 44 47.0 10.5 103.7 16.4 16.1 163 161.0 25.5 223 220.3 34.9 28.2 278 278.5 44.1 42.4 14.5 6.6 102 100.7 16.0 162 160.0 25.3 222 219.3 34.7 282 278.5 44.3 42.5 6.7 103 101.7 16.1 163 161.0 25.5 223 220.3 34.9 28.2 278.5 44.3 44.4 7.0 100 107.7 16.1 163 160.0 25.7 224 221.2 35.0 284 285.5 44.5 44.4 7.0 100 107.7 16.4 16.9 16.9 26.9 22.2 22.2 25.2 25.2 25.2 28.2 28.5 24.5 28.5 24.4 26.5 24.4 24.5 5.6 6.9 104.7 16.6 162 160.0 25.7 224 221.2 35.0 284 280.5 44.4 47.4 7.5 108 106.7 16.9 16.8 16.9 26.9 2 |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 22 21.7 3.4 82 81.0 12.8 142 140.3 22.2 202 199.5 31.6 262 258.8 41.0 24 29.7 3.8 84 83.0 13.1 144 142.2 22.5 204 201.5 31.9 264 260.7 41.5 25 24.7 3.9 85 84.0 13.3 145 143.2 22.7 203 200.5 31.9 264 260.7 41.5 26 25.7 4.1 86 84.9 13.5 145 143.2 22.7 205 202.5 32.1 265 261.7 41.5 27 26.7 4.2 87 85.9 13.6 147 145.2 23.0 207 204.5 32.4 267 263.7 41.8 28 27.7 4.4 88 86.9 13.8 148 146.2 23.2 208 205.4 32.5 266 262.7 41.5 29 28.6 4.5 89 87.9 13.9 149 147.9 23.3 209 206.4 32.7 266.7 42.2 30 29.6 4.5 89 87.9 13.9 149 147.9 23.3 209 206.4 32.7 206.7 266.7 42.2 31 30.6 4.5 89 37.9 13.9 149 147.9 23.3 209 206.4 32.7 206.7 266.7 42.2 31 30.6 5.0 92 90.9 14.4 152 150.1 23.8 12 209.4 33.0 271 267.7 42.4 32 33.6 5.0 92 90.9 14.4 152 150.1 23.8 12 209.4 33.0 271 267.7 42.4 33.6 5.2 93 31.9 14.5 153 151.1 23.9 213 210.4 33.3 273 269.642.7 34 33.6 5.5 95 93.8 14.9 155 153.1 24.9 215 212.4 33.6 5.5 34.6 5.5 95 93.8 14.9 155 153.1 24.9 215 212.4 33.8, 273 279 266.42.9 375 36.5 5.8 97 95.8 15.2 157 155.1 24.6 217. 214.3 33.9 277 275.643.2 37 36.5 5.8 97 95.8 15.2 157 155.1 24.6 217. 214.3 33.9 277 275.643.2 37 36.5 5.8 97 95.8 15.2 157 155.1 24.6 217. 214.3 33.9 277 275.643.2 37 36.5 5.9 98 96.8 15.5 156 154.1 24.4 216 213.3 34.8 279 275.643.2 37 36.5 5.9 98 96.8 15.5 156 156.1 24.7 218 215.3 34.1 279 275.643.2 37 36.5 5.9 98 96.8 15.5 156 156.1 24.7 218 215.3 34.1 279 275.643.2 37 36.5 5.9 98 96.8 15.5 159 157.0 24.9 219 216.3 34.3 279 275.643.8 37.5 5.9 98 96.8 15.0 166.1 166. |       |       |       |          |        | !i       |       |       |         |        | !     |       | <u> </u>    |        |        |
| 28 22.7 3.6 84 84 83.0 13.1 144 142.2 22.5 204 207.5 31.8 263 269.8 41.1 25 24.7 3.9 85 84.0 13.9 145 143.2 22.5 204 201.5 31.9 264 260.7 41.5 266 25.7 4.1 86 84.9 13.5 146 144.2 22.8 206 203.5 32.2 266 262.7 41.6 27 26.7 4.2 87 85.9 13.6 147 145.2 23.0 207 204.5 32.4 267 263.7 41.8 28 27.7 4.4 88 86.9 13.8 148 146.2 23.0 207 204.5 32.4 267 263.7 41.6 29 28.6 4.5 89 87.9 13.9 149 147.2 33.3 209 206.4 32.7 269 265.7 42.1 30 29.6 4.7 90 88.9 14.1 150 148.2 23.5 210 207.4 32.9 270 266.7 42.2 31 30.6 4.8 91 89.9 14.2 151 149.1 23.3 210 207.4 32.9 270 266.7 42.2 31 30.6 5.0 92 90.9 14.4 152 150.1 23.8 212 209.4 33.2 272 268.7 42.6 33 32.6 5.2 93 91.9 14.5 153 151.1 23.9 213 210.4 33.9 273 269.6 42.7 34 32.9 34 33.6 5.3 94 92.8 14.7 154 155.1 152.1 24.1 214 211.4 33.5 272 272 268.7 42.6 33 32.6 5.3 94 92.8 14.7 154 152.1 24.1 214 211.4 33.5 273 269.6 42.7 36 36 35.6 5.6 96 94.8 15.0 156 154.1 24.4 216 213.3 39.8 276 272.6 43.2 38 37.5 5.9 98 96.8 15.3 158 156.1 24.7 218 215.3 33.8 276 272.6 43.2 38 37.5 5.9 98 96.8 15.3 158 156.1 24.7 218 215.3 34.1 278 273.6 43.5 39 38.5 6.1 99 97.8 15.5 159 157.0 24.9 19 216.3 34.1 278 273.6 43.5 39 38.5 6.1 99 97.8 15.5 169 157.0 24.9 19 216.3 34.9 259 276.6 43.8 44.4 45.5 6.6 102 100.7 16.0 162 160.0 25.3 222 217 3 34.4 280 276.6 43.8 44.4 47.0 10.5 103.7 16.1 163 161.0 25.5 222 217 3 34.4 280 276.6 43.8 44.4 47.0 10.5 103.7 16.4 165 163.0 25.7 224 221.2 35.0 282 281.5 44.6 45.4 7.2 106 104.7 16.6 166 164.9 26.1 227 224.2 35.5 287 283.5 44.9 48.4 7.7 109 107.7 17.1 169 168 165.9 26.9 26.2 222 277.3 34.9 283 278.5 44.5 24.4 47.5 108 106.7 16.9 168 165.9 26.9 26.2 222 277.3 34.9 283 278.5 44.5 24.6 45.4 7.2 106 104.7 16.6 166 164.9 26.1 227 224.2 23.5 2.9 23.5 2.9 282.5 283.5 44.5 280.5 44.5 45.9 44.4 7.5 108 106.7 16.9 168 165.9 26.4 229 224.2 35.5 287 283.5 44.5 25.5 44.6 45.4 7.2 106 104.7 16.6 166 166.9 26.9 26.2 222 277.3 34.9 283 284.5 45.7 109 44.7 100 105.7 16.7 16.7 167 164.9 26.1 227 224.2 23.5 .5 287 283.5 44.5 287 283.5 44.5 299 283.4 45.5 54.4 53.8 8.8 110 106.6 17.2 1 |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 24 23.7 3.8 8 84 88.0 13.1 144 142.22.5 20.7 201.5 31.9 264 260.7 41.5 26 25.7 4.1 86 84.9 13.5 145 143.22.7 205 202.5 32.1 265 261.7 41.5 26 25.7 4.1 86 84.9 13.5 146 144.22.8 20.6 203.5 32.2 266 262.7 41.6 27 26.7 4.2 87 85.9 13.6 147 145.223.0 207 204.5 32.4 267 263.7 41.8 28 27.7 4.4 88 86.9 13.8 148 146.223.5 200 207 204.5 32.4 267 263.7 41.8 29 28.6 4.5 89 87.9 13.9 149 147.223.3 209 206.4 32.7 268 264.7 41.9 29 28.6 4.5 89 87.9 13.9 149 147.223.3 209 206.4 32.7 268 265.7 42.1 30 29.6 4.7 90 88.9 14.1 150 148.223.5 210 207.4 32.9 270 266.7 42.2 31 30.6 4.8 91 89.9 14.2 151 149.1 23.6 211 208.4 33.0 271 267.7 42.4 33 32.6 5.0 92 90.9 14.5 153 151.1 23.9 213 210.4 33.3 273 269.6 42.7 34 33.6 5.3 94 92.8 14.7 154 152.1 24.1 214 211.4 33.5 272 269.6 42.7 34 33.6 5.3 94 92.8 14.7 154 152.1 24.1 214 211.4 33.5 274 270.6 42.9 35 34.5 35.5 34.6 5.5 99 38.8 14.9 155 153.1 124.2 215 212.4 33.6 275 271.6 43.0 36 35.6 5.6 96 94.8 15.0 156 154.1 24.4 216 213.3 38.8 276 272.6 43.2 37 36.5 5.8 97 95.8 15.2 157 155.1 24.6 217 214.3 33.9 277 273.6 43.2 378 35.5 5.9 98 90.8 15.3 158 166.1 24.7 218 215.3 34.1 278 274.6 43.5 39 38.5 6.1 99 97.8 15.5 159 157.0 24.9 219 216.3 34.3 279 275.6 43.6 43 39.5 6.1 199 97.8 15.5 159 157.0 24.9 219 216.3 34.3 279 275.6 43.6 43.4 42.5 6.7 103 101.7 16.1 163 161.0 25.5 220 217.3 34.4 280 276.6 43.8 44.4 7.0 105 100.7 16.0 162 160.0 25.3 222 219.3 34.7 282 278.5 44.1 44.4 7.0 105 100.7 16.0 162 160.0 25.3 222 219.3 34.7 282 278.5 44.1 44.4 7.0 105 103.7 16.4 165 163.0 25.0 220 217.3 34.9 283 279.5 44.3 44.4 7.0 105.7 16.9 16.8 161.0 205.3 222 219.3 34.7 282 278.5 44.1 44.4 7.5 108 104.7 16.9 16.8 161.0 205.3 222 219.3 34.7 282 278.5 44.1 44.4 7.0 105.7 16.9 16.8 161.0 25.5 223 220.3 34.9 283 279.5 44.3 44.4 7.0 105.7 16.9 16.8 161.0 25.5 223 220.3 34.9 283 279.5 44.5 45.5 44.4 7.2 106 104.7 16.6 166 164.0 26.0 226 233.2 35.4 282 279.5 44.5 55 44.4 7.2 106 104.7 16.9 16.8 162.0 25.7 224 221.3 35.0 299 286.4 45.4 55 44.4 7.2 106 104.7 16.9 168 165.9 26.9 232 222.1 36.0 299 286.4 45.5 55 43. |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 26         25.7         4.1         86         84.9         13.5         146         144.2         22.8         906         203.5         32.2         266         262.7         41.6           28         27.7         4.4         88         86.9         13.8         148         146.2         23.2         208         205.4         32.2         268         264.7         41.9           30         29.6         4.5         89         87.9         13.9         149         147.2         23.3         209         206.4         32.7         269         265.7         42.1           31         30.6         4.8         91         89.9         14.2         151         149.1         23.6         211         208.4         33.2         272         266.7         42.2           32         31.6         5.0         92         90.9         14.4         152         150.1         13.8         212         200.4         33.2         277         266.7         42.6           33         32.6         5.2         93         91.4         1.52         150.1         150.1         150.1         212         200.4         33.2         277         266.7         <  |       |       |       |          | 83.0   |          |       | 142.2 | 22.5    |        |       |       |             |        |        |
| 27   26.7   4.2   87   85.9   13.6   147   145.2   23.0   207   204.5   32.4   267   263.7   41.8   28   27.7   4.4   88   86.9   13.8   148   146.2   23.2   208   205.4   32.5   268   264.7   41.9   29   28.6   4.5   89   87.9   13.9   149   147.2   23.3   209   206.4   32.7   269   265.7   42.1   30   29.6   4.7   90   88.9   14.1   150   148.2   23.5   210   207.4   32.9   270   266.7   42.2   31   30.6   4.8   91   89.9   14.2   151   149.1   23.6   211   208.4   35.0   271   267.7   42.4   32   31.6   5.0   92   90.9   14.4   152   150.1   23.8   212   209.4   33.2   272   268.7   42.2   33   32.6   5.2   93   91.9   14.5   153   151.1   23.9   213   210.4   33.3   273   268.7   42.6   34   33.6   5.3   94   92.8   14.7   154   152.1   24.1   214   211.4   33.5   274   270.6   42.9   35   34.6   5.5   95   93.8   14.9   155   153.1   24.2   215   212.4   33.6   275   271.6   43.0   36   35.6   5.6   96   94.8   15.0   156   154.1   24.4   216   213.3   33.8   277   273.6   43.2   38   37.5   5.9   98   96.8   15.3   158   156.1   24.7   218   215.3   34.1   278   274.6   43.5   39   38.5   6.1   99   97.8   15.5   159   157.0   24.9   219   216.3   34.3   279   275.6   43.5   41   40.5   6.4   101   99.8   15.8   161   159.0   25.2   221   218.3   34.4   280   276.6   43.8   41   40.5   6.4   101   99.8   15.8   161   159.0   25.5   223   220.3   34.9   283   277.5   44.0   42   41.5   6.6   102   100.7   16.0   162   160.0   25.5   223   220.3   34.9   283   279.5   44.4   43   42.5   6.7   103   101.7   16.1   163   161.0   25.5   223   220.3   34.9   283   279.5   44.4   44   47.0   105   103.7   16.4   165   163.0   25.5   223   220.3   34.9   283   279.5   44.4   44   47.5   6.9   104.7   16.6   166   166.0   26.0   25.5   223   222.2   35.2   285   281.5   44.6   45   44.4   7.7   109   107.7   17.1   169   166.9   26.8   230   227.2   36.0   290   286.4   45.4   47   48   47.4   7.5   108   106.7   16.9   168   165.9   26.6   230   227.2   36.0   290   286.4   45.4   48   47.4   7.5   108   106.7    |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 28   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 29   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 30         29.6         4.7         90         88.9         14.1         150         148.2   23.5         210         207.4         32.9         270         266.7   42.2           31         30.6         4.8         91         89.9         14.2         151         149.1   23.6         211         208.4         33.0         271         267.7   42.4           32         31.6         5.0         92         90.9         14.4         152         150.1   23.8         212         209.4         33.2         272         268.742.6         242.6           34         33.6         5.3         94         92.8         14.7         154         152.124.1         214         211.4         33.5         274         270.6   42.7           35         34.6         5.5         95         93.8         14.9         155         153.124.2         215         212.4         33.6         275         271.6   43.0           36         35.6         3.6         96         94.8         15.0         155         159.124.6         217         214.3         33.6         277         273.6   43.2           37         36.5         3.8         97         95.8         15.2         1   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 32   |       |       |       | li .     |        |          | 4     |       |         | 1      |       |       |             |        |        |
| 32   31.6   5.0   92   90.9   14.4   152   150.1   23.8   212   209.4   33.2   272   268.7   42.6   33   32.6   5.2   93   91.9   14.5   153   151.1   23.9   213   210.4   33.5   273   269.6   42.7   34.3   35.6   5.5   95   93.8   14.9   155   153.1   24.1   214   211.4   33.5   275   271.6   43.0   36   35.6   5.6   96   94.8   15.0   156   154.1   24.4   216   213.3   33.8   276   272.6   43.2   37   36.5   5.8   97   95.8   15.2   157   155.1   24.6   217   214.3   33.9   277   273.6   43.2   37.5   5.9   98   96.8   15.3   158   156.1   24.7   218   215.3   34.1   278   274.6   43.5   39.3   35.5   6.3   100   99.8   15.5   159   157.0   24.9   219   216.3   34.3   279   275.6   43.6   40   39.5   6.3   100   99.8   15.6   160   158.0   25.0   220   217.3   34.4   280   276.6   43.8   41   40.5   6.4   101   99.8   15.8   161   159.0   25.2   221   218.3   34.6   281   277.5   44.0   42.5   6.9   104   102.7   16.3   161.0   25.5   223   220.3   34.9   268   275.5   44.1   43.5   6.9   104   102.7   16.3   161.0   25.5   223   220.3   34.9   268   275.5   44.4   45.4   47.0   105   103.7   16.4   165   163.0   25.8   225   222.2   35.2   285   281.5   44.6   45.4   7.2   106   104.7   16.6   166   164.0   26.0   226   223.2   35.4   286   282.5   44.7   46.4   7.4   107   105.7   16.7   167   164.9   26.1   227   224.2   35.5   287   283.5   44.9   48.4   7.7   109   107.7   17.1   169   166.9   26.4   229   226.2   35.8   289   285.4   45.1   49   48.4   7.7   109   107.7   17.1   169   166.9   26.4   229   226.2   35.8   289   285.4   45.1   49   48.4   7.7   109   107.7   17.1   169   166.9   26.4   229   226.2   35.8   289   285.4   45.5   25   38.8   111   110.6   17.5   172   169.9   26.6   230   237.2   36.0   290   286.4   45.4   51   50.4   38.8   114   112.6   17.8   17.5   172.8   27.4   235   233.1   36.8   295   291.4   46.1   56.5   55.3   8.8   116   114.6   18.1   176   173.8   27.5   236   233.1   36.8   295   291.4   46.1   56.5   55.3   8.8   117   115.6   18.5   177   178.8   27.7   237 | 31    | 30.6  | 4.8   | 91       | 89.9   | 14.2     | 151   | 149.1 | 23.6    | 211    | 208.4 | 33.0  | 271         | 267.7  | 42.4   |
| 34         33.6         5.3         94         92.8         14.7         154         152.1         24.1         214         211.4         33.5         274         270.6         42.9           35         34.6         5.5         95         93.8         14.9         155         153.1         24.2         215         212.4         33.6         275         271.6         43.2           36         35.6         5.6         96         94.8         15.0         156         154.1         24.4         216         213.3         33.8         276         272.6         43.2           37         36.5         5.8         97         95.8         15.5         159         157.1024.9         219         216.3         34.1         278         274.6         43.5           39         38.5         6.1         99         97.8         15.5         159         157.024.9         219         216.3         34.1         278         274.6         43.5           40         39.5         6.3         100         98.8         15.6         160         158.0         25.0         221         217.3         34.1         282         275.6         43.2  |       | 31.6  | 5.0   |          | 90.9   | 14.4     | 152   | 150.1 | 23.8    | 212    | 209.4 | 33.2  |             |        |        |
| 35         34.6         5.5         95         93.8         14.9         155         153.1 24.2         215         212.4         33.6         275         271.6 43.0         36         35.6         5.6         96         94.8         15.0         156         154.1 24.4         216         213.3         33.8         276         272.6 43.2         37         36.5         5.8         97         95.8         15.2         157         155.1 24.6         217         214.3         33.9         277         273.6 43.3         38         37.5         5.9         98         96.8         15.5.5         159         157.0 24.9         219         216.3         34.3         279         275.6 43.6         40         39.5         6.3         100         98.8         15.6         160         158.0 25.0         220         217.3         34.4         280         276.6 43.8           41         40.5         6.4         101         99.8         15.8         161         159.0 25.2         221         218.3         34.6         281         277.5 44.0         42         41.5         6.6         102         100.7         16.0         162         160.0 25.3         222         221.3         34.9         282   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 36         35.6         5.6         96         94.8         15.0         156         154.1         24.4         216         213.3         33.8         276         272.6         43.2           37         36.5         5.8         97         95.8         15.2         157         155.1         24.6         217         214.3         33.9         276         272.6         43.2           38         37.5         5.9         98         96.8         15.3         158         156.1         24.7         218         215.3         34.1         278         274.6         43.5           99         78.8         15.5.6         160         158.0         25.0         220         217.3         34.4         280         276.6         43.6           40         39.5         6.3         100         98.8         15.6         160         158.0         25.0         220         217.3         34.4         280         276.6         43.8           41         40.5         6.4         101         99.8         15.8         161         159.0         25.2         221         218.3         34.6         281         277.5         44.0           41 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>  |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 37         36.5         5.8         97         95.8         15.2         157         155.1 24.6         217         214.3         33.9         277         273.6 43.3         38         37.5         5.9         98         96.8         15.3         158         156.1 24.7         218         215.3         34.1         278         274.6 43.5         39         38.5         6.1         99         97.8         15.5         159         157.0 24.9         219         216.3         34.3         279         275.6 43.6         40         39.5         6.3         100         99.8         15.6         160         158.0 25.0         220         217.3         34.4         280         276.6 43.8           41         40.5         6.4         101         99.8         15.8         161         159.0 25.2         221         218.9         34.6         281         277.5 44.0         42         41.5         6.6         102         100.7         16.0         162         160.0 25.5         222         219.3         34.7         282         278.5 44.1         43.5         6.9         104         102.7         16.1         163         161.0 25.5         223         222.2         235.2         222.2         235.2<  |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 38         37.5         5.9         98         96.8         15.3         158         156.1   24.7         218         215.3         34.1         278         274.6   43.5         39         38.5         6.1         99         97.8         15.5.5         159         157.0   24.9         219         216.3         34.3         279         275.6   43.6         40         39.5         6.3         100         98.8         15.6         160         158.0   25.0         220         217.3         34.4         280         276.6   43.8         41         40.5         6.4         101         99.8         15.8         161         159.0   25.2         221         218.3         34.6         281         277.5   44.0         42         41.5         6.6         102         100.7         16.0         162         160.0   25.3         222         221.9         34.7         282         277.5   44.0         43.4         43.5         6.9         104         102.7         16.3         164         162.0   25.3         222         223         230.3         34.9         283         279.5   44.3         44         43.5         6.9         104.102.7         16.3         164.162.0   25.7         224         221.2         35.0         284   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 40   |       |       |       |          |        |          |       | 156.1 | 24.7    | 218    | 215.3 |       | 278         |        |        |
| 41  40.5  6.4  101  99.8  15.8  161  159.0  25.2  221  218.3  34.6  281  277.5  44.0  42  41.5  6.6  102  100.7  16.0  162  160.0  25.3  222  219.3  34.7  282  278.5  44.1  43.5  6.9  104  102.7  16.3  164  162.0  25.7  224  221.2  35.0  284  280.5  44.4  44.5  6.9  104  102.7  16.3  164  165  163.0  25.8  225  222.2  35.2  285  281.5  44.6  45.4  7.2  106  104.7  16.6  166  164.0  26.0  26  228.2  35.4  286  282.5  44.4  47.4  7.0  105  103.7  16.7  167  164.9  26.1  227  224.2  35.5  287  283.5  44.9  48.4  7.4  107  105.7  16.7  167  164.9  26.1  227  224.2  35.5  287  283.5  44.9  48.4  7.5  108  106.7  16.9  168  165.9  26.3  228  225.2  35.7  288  284.5  45.1  49.4  48.4  7.7  109  107.7  17.1  169  166.9  26.4  229  226.2  35.8  289  285.4  45.2  50.4  49.4  7.8  110  108.6  17.2  170  167.9  26.6  230  227.2  36.0  290  286.4  45.4  51  50.4  8.0  111  109.6  17.4  171  168.9  26.8  231  228.2  36.1  291  287.4  45.5  52.3  8.8  113  111.6  17.7  173  170.9  27.1  233  230.1  36.3  292  288.4  45.7  53  52.3  8.8  113  111.6  17.7  178  170.9  27.1  233  230.1  36.3  292  288.4  45.7  53  52.3  8.8  113  111.6  17.7  178  170.9  27.1  233  230.1  36.3  292  288.4  45.8  54.5  53.3  8.4  114  112.6  17.8  17.4  171.9  27.2  234  231.1  36.6  294  290.4  46.0  55  54.3  8.6  115  113.6  18.0  175  172.8  27.4  235  232.1  36.8  295  291.4  46.1  55  55.3  8.8  116  114.6  18.1  176  173.8  27.5  236  233.1  36.9  296  292.4  46.3  55  58.8  39.2  119  117.5  18.6  179  176.8  27.5  286  233.1  37.1  297  293.3  46.5  59  58.3  9.2  119  117.5  18.6  179  176.8  27.8  288  235.1  37.2  298  294.3  46.6  60  59.3  9.4  120  118.5  18.8  180  177.8  28.2  240  237.0  37.5  300  296.3  46.9   Dist. Dep. D.Lat  Dist. Dep. D.Lat  Dist. Dep. D.Lat   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 42   | -     | 39.5  | 6.3   | ľ        | 98.8   | 15.6     |       |       | !       | 220    | 217.3 | 34.4  |             | 276.6  | 49.8   |
| 43. 42.5 6.7 103 101.7 16.1 163 161.0 25.5 223 220.3 34.9 283 279.5 44.3 44 43.5 6.9 104 102.7 16.3 164 162.0 25.7 224 221.2 35.0 284 280.5 44.4 45.4 7.0 105 103.7 16.4 165 163.0 25.8 225 222.2 35.2 285 281.5 44.6 46 45.4 7.2 106 104.7 16.6 166 164.0 26.0 26.0 226 283.2 35.4 286 282.5 44.7 17.5 108 106.7 16.7 167 167 164.9 26.1 227 224.2 35.5 287 283.5 44.9 48.4 7.5 108 106.7 16.9 168 165.9 26.3 228 225.2 35.7 288 284.5 45.1 49.4 48.4 7.7 109 107.7 17.1 169 166.9 26.4 229 226.2 35.8 289 285.4 45.2 50 49.4 7.8 110 108.6 17.2 170 167.9 26.6 230 227.2 36.0 290 286.4 45.4 51 50.4 8.0 111 109.6 17.4 171 168.9 26.8 231 228.2 36.1 291 287.4 45.5 52.3 8.8 113 111.6 17.7 173 170.9 27.1 233 230.1 36.3 292 288.4 45.7 53 52.3 8.3 113 111.6 17.7 173 170.9 27.1 233 230.1 36.3 292 288.4 45.8 54 53.3 8.4 114 112.6 17.8 174 171.9 27.2 234 231.1 36.6 294 290.4 46.0 55 54.3 8.6 115 113.6 18.0 175 172.8 27.4 235 232.1 36.8 295 291.4 46.1 56 55.3 8.8 116 114.6 18.1 176 173.8 27.5 236 233.1 36.9 296 292.4 46.5 59 58.3 9.2 119 117.5 18.6 179 176.8 28.0 239 236.1 37.4 299 292.3 46.5 59 58.3 9.2 119 117.5 18.6 179 176.8 28.0 239 236.1 37.4 299 295.3 46.6 59 58.3 9.2 119 117.5 18.6 179 176.8 28.0 239 236.1 37.4 299 295.3 46.8 60 59.3 9.4 120 118.5 18.8 180 177.8 28.2 240 237.0 37.5 300 296.3 46.9 Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 44   43.5   6.9   104   102.7   16.3   164   162.0   25.7   224   221.2   35.0   284   280.5   44.4   47.0   105   103.7   16.4   165   163.0   25.8   225   222.2   35.2   285   281.5   44.6   46   45.4   7.2   106   104.7   16.6   166   164.0   26.0   226   223.2   35.2   285   281.5   44.6   47.4   7.5   108   106.7   16.7   167   164.9   26.1   227   224.2   35.5   287   283.5   44.9   48.4   7.7   109   107.7   17.1   169   166.9   26.4   229   226.2   35.8   289   285.4   45.2   250   49.4   7.8   110   108.6   17.2   170   167.9   26.6   230   227.2   36.0   290   286.4   45.4   251   35.8   281   112   110.6   17.5   172   169.9   26.8   231   228.2   23.1   36.4   299   286.4   45.5   253   38.8   113   111.6   17.7   173   170.9   27.1   233   230.1   36.4   299   289.4   45.8   45.3   38.4   114   112.6   17.8   174   171.9   27.2   234   231.1   36.6   294   290.4   46.0   255   54.3   8.6   115   113.6   18.0   175   172.8   27.5   236   233.1   36.9   296   292.4   46.1   36.5   36.3   39.2   39.4   45.8   39.2   39.4   45.1   39.5   39.4   45.8   39.2   39.4   39.5   39.4   46.6   39.5   39.4   39.5   39.4   39.5   39.4   39.5   39.4   46.6   39.5   39.4   39.5   39.5   39.4   39.5   39.5   39.4   39.5   39.5   39.5   39.4   39.5   39. |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 45   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 46   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 47 4 6.4 7.4 107 105.7 16.7 168 168.9 26.1 227 224.2 35.5 287 288.5 144.9 48.4 7.7 109 107.7 17.1 169 166.9 26.4 229 226.2 35.8 289 284.5 145.2 50 10.0 10.0 10.0 10.0 10.0 10.0 10.0 1  |       |       |       |          |        |          |       | 164.0 | 26.0    |        |       |       |             |        |        |
| 49   |       |       |       |          |        | 16.7     |       |       |         |        |       |       |             |        |        |
| 50 49.4 7.8 110 108.6 17.2 170 167.9 26.6 230 227.2 36.0 290 286.4 45.4 51 50.4 8.0 111 109.6 17.4 171 168.9 26.8 231 228.2 36.1 291 287.4 45.5 52 51.4 8.1 112 110.6 17.5 172 169.9 26.9 232 229.1 36.3 292 288.4 45.7 53 52.3 8.3 113 111.6 17.7 173 170.9 27.1 233 230.1 36.4 293 289.4 45.8 54 53.3 8.4 114 112.6 17.8 17.8 170.9 27.1 233 230.1 36.4 293 289.4 45.8 54 53.3 8.4 114 112.6 18.0 175 172.8 27.4 235 232.1 36.6 294 290.4 46.0 55 54.3 8.6 115 113.6 18.0 175 172.8 27.4 235 232.1 36.8 295 291.4 46.1 56 55.3 8.8 116 114.6 18.1 176 173.8 27.4 235 232.1 36.8 295 291.4 46.3 57 56.3 8.9 117 115.6 18.3 177 174.8 27.7 237 234.1 37.1 297 293.3 46.5 59 58.3 9.2 119 117.5 18.6 179 176.8 28.0 239 236.1 37.2 298 294.3 46.6 60 59.3 9.4 120 118.5 18.8 180 177.8 28.2 240 237.0 37.5 300 296.3 46.9 Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 51 50.4 8.0 111 109.6 17.4 171 168.9 26.8 231 228.2 36.1 291 287.4 45.5 52 51.4 8.1 112 110.6 17.5 172 169.9 26.9 232 299.1 36.3 292 288.4 45.7 53 52.3 8.3 113 111.6 17.7 173 170.9 27.1 233 230.1 36.4 293 289.4 45.8 54 53.3 8.4 114 112.6 17.8 174 171.9 27.2 234 231.1 36.6 294 290.4 46.0 55 54.3 8.6 115 113.6 18.0 175 172.8 27.4 235 232.1 36.8 295 291.4 46.1 56 55.3 8.8 116 114.6 18.1 176 173.8 27.5 236 233.1 36.9 296 292.4 46.3 57 56.3 8.9 117 115.6 18.3 177 174.8 27.7 237 234.1 37.1 297 293.3 46.5 58 57.3 9.1 118 116.5 18.5 178 175.8 27.8 238 235.1 37.2 298 294.3 46.6 59 58.3 9.2 119 117.5 18.6 179 176.8 28.0 239 236.1 37.4 299 295.3 46.8 60 59.3 9.4 120 118.5 18.8 180 177.8 28.2 240 237.0 37.5 300 296.3 46.9 Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat  |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 52 51.4 8.1 112 110.6 17.5 172 169.9 26.9 232 229.1 36.3 292 288.4 45.7 53 52.3 8.3 113 111.6 17.7 173 170.9 27.1 233 230.1 36.4 293 289.4 45.8 54.3 8.6 115 113.6 18.0 175 172.8 27.4 235 232.1 36.6 294 290.4 46.0 55 54.3 8.6 115 113.6 18.0 175 172.8 27.4 235 232.1 36.8 295 291.4 46.1 16 15.1 176 173.8 27.4 235 232.1 36.8 295 291.4 46.1 56 55.3 8.8 116 114.6 18.1 176 173.8 27.7 236 233.1 36.9 296 292.4 46.3 57 56.3 8.9 117 115.6 18.3 177 174.8 27.7 237 234.1 37.1 297 293.3 46.5 59 58.3 9.2 119 117.5 18.6 179 176.8 27.8 28.2 232.1 37.2 298 294.3 46.6 60 59.3 9.4 120 118.5 18.8 180 177.8 28.2 240 237.0 37.5 300 296.3 46.9 Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.Lat   | -     |       |       | <u> </u> |        |          |       |       |         | -      | .'    |       | <u> </u>    | -      |        |
| 53 52.3 8.3 113 111.6 17.7 173 170.9 27.1 233 230.1 36.4 293 289.4 45.8 54 53.3 8.4 114 112.6 17.8 174 171.9 27.2 234 231.1 36.6 294 290.4 46.0 55 54.3 8.6 115 113.6 18.0 175 172.8 27.4 235 232.1 36.8 295 291.4 46.1 56 55.3 8.8 116 114.6 18.1 176 173.8 27.5 236 233.1 36.9 296 292.4 46.3 57 56.3 8.9 117 115.6 18.3 177 174.8 27.7 237 234.1 37.1 297 293.3 46.5 58 57.3 9.1 118 116.5 18.5 178 175.8 27.8 238 235.1 37.2 298 294.3 46.6 59 58.3 9.2 119 117.5 18.6 179 176.8 28.0 239 236.1 37.4 299 295.3 46.6 60 59.3 9.4 120 118.5 18.8 180 177.8 28.2 240 237.0 37.5 300 296.3 46.9 Dist. Dep. D.Lat   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 54 53.3 8.4 114 112.6 17.8 174 171.9 27.2 234 231.1 36.6 294 290.4 46.0 55 54.3 8.6 115 113.6 18.0 175 172.8 27.4 295 232.1 36.8 295 291.4 46.1 16 56 55.3 8.8 116 114.6 18.1 176 173.8 27.5 236 233.1 36.9 296 292.4 46.3 57 56.3 8.9 117 115.6 18.3 177 174.8 27.7 237 234.1 37.1 297 293.3 46.5 58 57.3 9.1 118 116.5 18.5 178 175.8 27.8 238 235.1 37.2 298 294.3 46.6 59 58.3 9.2 119 117.5 18.6 179 176.8 28.0 239 236.1 37.4 299 295.3 46.6 60 59.3 9.4 120 118.5 18.8 180 177.8 28.2 240 237.0 37.5 300 296.3 46.9 Dist. Dep. D.Lat  |       | l     |       |          | l      |          |       | 170.9 | 27.1    |        | 1     |       |             | laa    |        |
| 55   54.3   8.6   115   113.6   18.0   175   172.8   27.4   295   292.1   36.8   295   291.4   46.1   56   55.3   8.8   116   114.6   18.1   176   173.8   27.5   236   233.1   36.9   296   292.4   46.3   57   56.3   8.9   117   115.6   18.3   177   174.8   27.7   297   294.1   37.1   297   293.3   46.5   58   57.3   9.1   118   116.5   18.5   178   175.8   27.8   238   235.1   37.2   298   294.3   46.6   59   58.3   9.2   119   117.5   18.6   179   176.8   28.0   239   236.1   37.4   299   295.3   46.8   60   59.3   9.4   120   118.5   18.8   180   177.8   28.2   240   237.0   37.5   300   296.3   46.9   Dist.   Dep.   D.Lat   Dist.    |       |       |       |          |        |          |       | 171.9 | 27.2    |        |       |       |             |        |        |
| 56   55.3   8.8   116   114.6   18.1   176   173.8   27.5   236   233.1   36.9   296   292.4   46.3   57   56.3   8.9   117   115.6   18.3   177   174.8   27.7   237   234.1   37.1   227   2293.3   46.5   58   57.3   9.1   118   116.5   18.5   178   175.8   27.8   238   235.1   37.2   298   294.3   46.5   59   58.3   9.2   119   117.5   18.6   179   176.8   28.0   239   236.1   37.4   299   295.3   46.8   60   59.3   9.4   120   118.5   18.8   180   177.8   28.2   240   237.0   37.5   300   296.3   46.9   Dist.   Dep.   D.Lat   Dist.   Dep.   D. |       | 54.3  | 8.6   | 115      | 113.6  | 18.0     | 175   | 172.8 | 27.4    | 235    |       | 36.8  | 295         |        |        |
| 58 57.3 9.1 118 116.5 18.5 178 175.8 27.8 238 235.1 37.2 298 294.3 46.6 59 58.3 9.2 119 117.5 18.6 179 176.8 28.0 239 236.1 37.4 299 295.3 46.8 60 59.3 9.4 120 118.5 18.8 180 177.8 28.2 240 237.0 37.5 300 296.3 46.9 Dist. Dep. D.Lat   |       |       |       |          |        |          |       | 173.8 | 27.5    | 236    |       |       |             |        |        |
| 59 58.8 9.2 119 117.5 18.6 179 176.8 28.0 239 236.1 37.4 299 295.3 46.8 60 59.3 9.4 120 118.5 18.8 180 177.8 28.2 240 237.0 37.5 300 296.3 46.9 Dist. Dep. D.Lat  |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| 60 59.3 9.4 120 118.5 18.8 180 177.8 28.2 240 237.0 37.5 300 296.3 46.9 Dist. Dep. D.Lat   |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
| Dist. Dep. D.Lat Dist. Dep. D.1.at Dist. Dep. D.lat Dist. Dep. D.Lat Dist. Dep. D.Lat  |       |       |       |          |        |          |       |       |         |        |       |       |             |        |        |
|  | _     |       |       | ť        |        |          |       | .'    | <u></u> | l'     |       |       | l           |        |        |
|  |       | ьер.  | D.Lat | H 17186. | · Dep. | 1.1.1.4[ |       |       |         | ) D15C | Dep.  | w.Lat | () 1.715°C. | 1 neb. | ·w.Lat |

81 Degrees

104

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

10 Degrees. Dist. D. Lat Dep. Dist. D.Lat Dep. Dist. D.Lat Dep. 1 Dist. D.Lat Dep. Dist. |D.Lat | Dep. 178.3 31.4 0.2 10.6 21.0 237.3 41.8 1 1.0 61 60.1 121 119.2 181 241 2 2.0 0.3 62 10.8 21.2 182 122 120.1 179.2 31.6 242 238.3 42.0 61.1 180.2 31.8 181.2 32.0 239.3 42 2 240.3 42.4 241.3 42.5 3 3.0 0.5 63 21.4 183 62.0 10.9 123 121.1 243 21.5 4 3.9 0.7 64 63.0 11.1 124 122.1 184 244 5 21.7 185 182.232.1 4.9 0.9 65 64.) 11.3 125 123.1 245 242.3 42.7 5.9 1.0 65.0 11.5 21.0 186 183.2 32.3 6 66 126 124.1 246 7 6.9 1.2 22.1 187 184.2 32.5 243.2 42.9 67 66.0 11.6 127 125.1 247 244.2 43.1 245.2 43.2 246.2 43.4 8 7.9 1.4 68 11.8 22.2 188 185.1 32.6 248 67.0 128 126.1 9 8.9 1.6 69 68.0 12.0 129 127.0 22.4189 186.1 32.8 249 10 9.8 1.7 70 68.9 12.2 130 128.0 22.6 190 187.1 33.0 250 11 71 22.7 188.1 33.2 10.8 1.9 69.9 12.3 131 129.0 191 247.243.6 251 2.1 12.5 22.9 189.1 33.3 248.243.8 12 11.8 72 70.9 132 130.0 192 252 13 12.8 2.3 73 71.9 12.7 133 131.0 23.1 193 190.133.5 253 249.243.9 23.3 13.8 2.4 12.8 14 74 72.9 194 191,1|33.7 254 250.1 44.1 134 132.0 192.0 33.9 193.0 34.0 194.0 34.2 251.1 44.3 252.1 44.5 253.1 44.6 254.1 44.8 2.6 23.4 15 14.8 75 73.9 13.0 135 132.9 195 255 15.8 23.6 16 2.8 76 74.8 13.2 136 133.9 196 256 77 17 16.7 3.0 75.8 13.4 137 23.8 197 134.9 257 17.7 13.5 24.0 195.034.4 18 3.1 78 76.8 138 135.9 198 258 24.1 19 18.7 79 77.8 3.3 13.7 139 i36.9 199 196,034.6 259 255.1 45.0 197.0 34.7 20 19.7 3.5 80 78.8 13.9 140 137.9 24.3 200 260 256.1 45.1 21 20.7 3.6 81 79.8 14.1 141 138.9 24.5201 197.9 34.9 261 257.0 45.8 258.0 45.5 259.0 45.7 260.0 45.8 22 21.7 3.8 82 80.8 14,2 142 139.8 24.7 202 198.935.1 262 23 22.7 24.8 199.935.3 4.0 83 81.7 14.4 143 140.8 203 263 14.6 200.9 35.4 24 23.6 4.2 84 82.7 144 141.8 25.0 204 264 145 25 24.6 4.3 85 83.7 14.8 142.8 25.2 205 201.9 35.6 265 261.0,46.0 26 25.6 84.7 25.4 206 262.0 46.2 86 14.9 202.9 35.8 4.5 146 143.8 266 262.9 46.4 263.9 46.5 264.9 46.7 265.9 46.9 27 26.6 4.7 87 85.7 15.1 147 144.8 25.5 207 203,935.9 267 28 27.6 86.7 204.8 36.1 4.9 88 15.3 148 145.8 25.7 208 268 28.6 205.8 36.3 29 87.6 15.5 25.9 209 5.0 89 146.7 149 269 30 29.5 5.2 90 88.6 15.6 150 147.7 26.0 210 206.8 36.5 270 15.8 207.8 36.6 266.9 47.1 31 30.5 5.4 91 89.6 151 148.7 26.2 211 271 32 90.6 149.7 26.4 31.5 5.6 92 16.0 152 212 208,8 36.8 272 267.9.47.2 **3**3 32.5 5.7 93 91.6 16.1 153 150.7 26.6 213 209 8 37.0 273 268.9 47.4 34 33.5 5.9 94 92.6 16.3 154 151.7 26.7 214  $210.7\,87.2$   $211.7\,87.3$ 274 269.8 47.6 35 34.5 6.1 95 93.6 16.5 155 152.6 26.9 215 275 270.8 47.8 27.1 36 35.5 6.3 96 94.5 16.7 156 153.6 216 212.7 37.5 276 271.8 47.9 37 36.4 6.4 97 95.5 16.8 157 154.6 27.3 217 213.7 37.7 277 272.8 48.1 38 37.4 6.6 98 96.5 17.0 155.6 27.4 218 214.7 37.9 158 278 273.8 48.3 39 38.4 99 97.5 215.7 38.0 274.8 48.4 275.7 48.6 6.8 17.2 159 156.6 27.6 219 279 40 39.4 98.5 6.9 100 17.4 160 157.6 27.8 220 216.738.2 280 40.4 276.7 48.8 277.7 49.0 278.7 49.1 41 7.1 101 99.5 17.5 158.6 217.6 38.4 161 28.0 221 281 42 41.4 7.3 102 100.5 17.7 162 159.5 28.1 222 218.6 38.5 282 43 42.3 7.5 103 101.4 17.9 163 160 5 28.3 223 219.6 38.7 283 44 43.8 7.6 102.4 224 104 161.5 28.5 18.1 164 220.6 38.9 284 279.7 49.3 280.7 49.5 281.7 49.7 282.6 49.8 45 44.3 7.8 105 103.4 18.2 165 162.5 28.7 225 221.639.1 222.639.2 285 45.3 46 106 104.4 8.0 18.4 166 163.5 28.8 226 286 47 46.3 18.6 164.5 223.6 39.4 8.2 107 105.4 29.0 227 287 167 48 18 8 47.3 8.3 108 106.4 168 165.4 29.2 228 224.5 39.6 288 283.6 50.0 49 8.5 107.3 18.9 166.4 48.3 109 169 29.3 229 225.5 39.8 289 284.6 50.2 5<del>0</del> 49.2 8.7 19.1 167.4 285.6 50.4 110 108.3 170 29.5 230 226.5 39.9 290 227.5 40.1 228.5 40.3 229.5 40.5 230.4 40.6 5 I 50.2 8.9 111 29.7 109.3 19.3 171 168.4 231 286.6 50.5 291 51.2 52 9.0 112 110.5 19.4 172 169.4 29.9 232 292 287.6 50.7 9.2 111.3 19.6 53 52.2 113 173 170.4 233 30.0 293 288.550.9 289.5 51.1 54 53.2 9.4 114 112.3 19.8 174 171.4 30.2 234 294 54 2 55 9.6 115 113.8 20.0 175 172.3 30.4 235 231.440.8 295 290.5 51.2 35.1 9.7 56.1 9.9 20.1 173.3 56 116 114.2 176 30.6 236 232.4 41.0 296 291.551.4 233,441.2 234,441.3 235,441.5 292.5 51.6 293.5 51.7 294.5 51.9 57 117 115.2 20.5 237 177 174.3 30.7 297 58 57.1 10.1 118 116.2 20.5 178 175.3 30.9 238 298 59 58.1 10.2 20.7 119 117.2 179 176.3 31.1 239 299 60 59.1 10.4 120 118.2 20.8 180 177.3 240 236.4 41.7 295.452.1 31.3 300 Dist. Dep. D.Lat 80 Degrees.

|          |              |            |            |                |              |            | 11 Deg         | rees.        |            |                |              |            |                |              |
|----------|--------------|------------|------------|----------------|--------------|------------|----------------|--------------|------------|----------------|--------------|------------|----------------|--------------|
| Dist.    | D. Lat       | Dep.       | Dist.      | D. Lat         | Dep.         | Dist.      | D.Lat          | Dep.         | Dist.      | D. Lat         | Dep.         | Dist.      | D.Lat          | Dep.         |
| 1        | 1.0          | 0.2        | 61         | 59.9           | 11.6         | 121        | 118.8          | 23.1         | 181        | 177.7          | 34.5         | 241        | 236.6          | 46.0         |
| 2        | 2.0          | 0.4        | 62         |                | 11.8         | 122        | 119.8          |              | 182        | 178.7          | 34.7         | 242        | 237.6          | 46.2         |
| 3        | 2.9          | 0.6        | 63         |                | 12.0         | 123        | 120.7          | 23.5         | 183        | 179.6          | 34.9         | 243        | 238.5          | 46.4         |
| 4        | 3.9          | 0.8        | 64         |                | 12.2         | 124        | 121.7          | 23.7         | 184        | 180.6          | 35.1         | 244        | 239.5          | 46.6         |
| 5        | 4.9          | 1.0        | 65         |                | 12.4         | 125        | 122.7          | 23,9         | 185        | 181.6          | 35.8         | 245        | 240.5          | 46.7         |
| 6        | 5.9<br>6.9   | 1.1        | 66<br>67   |                | 12.6<br>12.8 | 126<br>127 | 123.7<br>124.7 | 24.0<br>24.2 | 186<br>187 | 182.6<br>183.6 | 35.5<br>35.7 | 246<br>247 | 241.5<br>242.5 | 46.9<br>47.1 |
| 8        | 7.9          | 1.5        | 68         |                | 13.0         | 128        | 125.6          | 24.4         | 188        | 184.5          | 35.9         | 248        | 243.4          | 47.3         |
| 9        | 8.8          | 1.7        | 60         |                | 13.2         | 129        | 126.6          | 24.6         | 189        | 185.5          | 36.1         | 249        | 244.4          | 47.5         |
| 10       | 9.8          | 1.9        | 70         |                | 13.4         | 130        | 127.6          | 24.8         | 190        | 186.5          | 96.3         | 250        | 245.4          | 47.7         |
| 11       | 10.8         | 2.1        | 71         | 60.7           | 13.5         | 131        | 128.6          | 25.0         | 191        | 187.5          | 36.4         | 251        | 246.4          | 47.9         |
| 12       | 11.8         | 2.1        | 72         |                | 13.3         | 132        | 129.6          | 25.2         | 191        | 188.5          | 36.6         | 252        | 247.4          | 48.1         |
| 13       | 12.8         | 2.5        | 73         |                | 13.9         | 133        | 130.6          | 25.4         | 193        | 189.5          | 36.8         | 253        | 248.4          | 48.3         |
| 14       | 13.7         | 2.7        | 74         |                | 14.1         | 134        | 131.5          | 25.6         | 194        | 190.4          | 37.0         | 254        | 249.3          | 48.5         |
| 15       | 14.7         | 2.9        | 75         |                | 14.3         | 135        | 132.5          | 25.8         | 195        | 191.4          | 37.2         | 255        | 250.3          | 48.7         |
| 16       | 15.7         | 3.1        | 76         |                | 14.5         | 136        | 183.5          | 26.0         | 196        | 192.4          | 37.4         | 256        | 251.3          | 48.8         |
| 17       | 16.7         | 3.2        | 77         |                | 14.7         | 137        | 134.5          | 26.1         | 197        | 193.4          | 37.6         | 257        | 252.3          | 49,0         |
| 18       | 17.7         | 3.4        | 78         |                | 14.9         | 138        | 135.5          | 26.3         | 198        | 194.4          | 37.8         | 258        | 253.3          | 49.2         |
| 19<br>20 | 18.7<br>19.6 | 3.6        | 79<br>80   | 77.5           | 15.1         | 139<br>140 | 136.4<br>137.4 | 26.5<br>26.7 | 199<br>200 | 195.3<br>196.3 | 38.0<br>38.2 | 259<br>260 | 254.2<br>255.2 | 49.4<br>49.6 |
|          |              |            |            |                |              |            | <u>'</u>       |              |            | <u>'</u>       | !            |            | <u>  </u>      |              |
| 21       | 20.6         | 4.0        | 81         | 79.5           |              | 141        | 138.4          | 26.9         | 201        | 197.3          | 38.4         | 261        | 256.2          | 49.8         |
| 22       | 21.6         | 4.2        | 82         | 80.5           |              | 142        | 139.4          | 27.1         | 202        | 198.3          | 38.5         | 262        | 257.2          | 50.0         |
| 28<br>24 | 22.6         | 4.4        | 83         | 81.5           |              | 143        | 140.4          | 27.3         | 203        | 199.3          | 38.7         | 263        | 258.2          | 50.2<br>50.4 |
| 25       | 23.6<br>24.5 | 4.6<br>4.8 | 84<br>85   | 82.5<br>83.4   |              | 144<br>145 | 141.4          | 27.5         | 204        | 200.3<br>201.2 | 38.9         | 264        | 259.1<br>260.1 | 50.4         |
| 26       | 25.5         | 5.0        | 86         | 84.4           |              | 146        | 142.9<br>143.3 | 27.7<br>27.9 | 205<br>206 | 202.2          | 39.1<br>39.5 | 265<br>266 | 261.1          | 50.8         |
| 27       | 26.5         | 5.2        | 87         | 85.4           |              | 147        | 144.3          | 28.0         | 207        | 203.2          | 39.5         | 267        | 262.1          | 50.9         |
| 28       | 27.5         | 5.3        | 88         | 86.4           |              | 148        | 145.3          | 28.2         | 208        | 204.2          | 39.7         | 268        | 263.1          | 51.1         |
| 29       | 28.5         | 5.5        | 89         | 87.4           | 17.0         | 149        | 146.3          | 28.4         | 209        | 205.2          | 39.9         | 269        | 264.1          | 51.8         |
| 30       | 29.4         | 5.7        | 90         | 88.3           | 17.2         | 150        | 147.2          | 28.6         | 210        | 206.1          | 40.1         | 270        | 265.0          | 51.5         |
| 31       | 30.4         | 5.9        | 91         | 89.3           | 17.4         | 151        | 148.2          | 28.8         | 211        | 207.1          | 40.3         | 271        | 266.0          | 51.7         |
| 32       | 31.4         | 6.1        | 92         | 90.3           |              | 152        | 149.2          | 29.0         | 212        | 208.1          | 40.5         | 272        | 267.0          | 51.9         |
| 33       | 32.4         | 6.3        | 93         | 91.3           |              | 153        | 150.2          | 29.2         | 213        | 209.1          | 40.6         | 273        | 268.0          | 52.1         |
| 34       | 33.4         | 6.5        | 94         | 92.3           |              | 154        | 151.2          | 29.4         | 214        | 210.1          | 40.8         | 274        | 269.0          | 52.3         |
| 35       | 34.4         | 6.7        | 95         | 93.3           |              | 155        | 152.2          | 29.6         | 215        | 211.0          | 41.0         | 275        | 269.9          | 52.5         |
| 36<br>37 | 35.3<br>36.3 | 6.9<br>7.1 | 96<br>97   | 94.2           |              | 156<br>157 | 153.1<br>154.1 | 29.8         | 216        | 212.0<br>213.0 | 41.2         | 276<br>277 | 270.9 $271.9$  | 52.7<br>52.9 |
| 38       | 37.3         | 7.5        | 98         | 95.2<br>96.2   |              | 158        | 155.1          | 30.0<br>30.1 | 217        | 214.0          | 41.6         | 278        | 272.9          | 53.0         |
| 39       | 38.3         | 7.4        | 99         | 97.2           |              | 159        | 156.1          | 30.1         | 219        | 215.0          | 41.8         | 279        | 273.9          | 53.2         |
| 40       | 39.3         | 7.6        | 100        | 98.2           |              | 160        | 157.1          | 30.5         | 220        | 216.0          | 42.0         | 280        | 274.9          | 53.4         |
| 41       | 40.2         | 7.8        | 101        | 99.1           |              | 161        | 158.0          | 80.7         | 221        | 216.9          | 42.2         | 281        | 275.8          | 53.6         |
| 42       | 41.2         | 8.0        | 102        | 100.1          |              | 162        | 159.0          | 30.9         | 222        | 217.9          | 42.4         | 282        | 276.8          | 53.8         |
| 43       | 42.2         | 8.2        | 103        | 101.1          |              | 163        | 160.0          | 31.1         | 223        | 218.9          | 42.6         | 283        | 277.8          | 54.0         |
| 44       | 43.2         | 8.4        | 104        | 102.1          |              | 164        | 161.0          | 31.3         | 224        | 219.9          | 42.7         | 284        | 278.8          | 54.2         |
| 45       | 44.2         | 8.6        | 105        | 103.1          | 20.O         | 165        | 162.0          | 31.5         | 225        | 220.9          | 42.9         | 285        | 279.8          | 54.4         |
| 46       | 45.2         | 8.8        | 106        | 104.1          |              | 166        | 163.0          | 31.7         | 226        | 221.8          | 43.1         | 286        | 280.7          | 54.6         |
| 47<br>48 | 46.1         | 9.0        | 107        | 105.0          |              |            | 163.9          | 31.9         | 227        | 222.8          | 43.3         | 287        | 281.7          | 54.8         |
| 48       | 47.1<br>48.1 | 9.2<br>9.3 | 108        | 106.0          |              | 168        | 164.9<br>165.9 | 32.1         | 228<br>229 | 223.8<br>224.8 | 49.5         | 288<br>289 | 282.7<br>283.7 | 55.0<br>55.1 |
| 50       | 49.1         | 9.5        | 110        | 107.0<br>108.0 |              | 170        | 166.9          | 32.2<br>32.4 | 230        | 225.8          | 43.9         | 290        | 284.7          | 55.3         |
|          |              |            |            |                |              |            |                |              |            | <u> </u>       |              |            |                |              |
| 51<br>52 | 50.1<br>51.0 | 9.7        | 111        | 109.0          |              | 171        | 167.9          | 32.6         | 231<br>232 | 226.8          | 44.1         | 291<br>292 | 285.7<br>286.6 | 55.5<br>55.7 |
| 53       | 52.0         |            | 112<br>113 | 109.9          |              | 172<br>173 | 168.8          | 32.8<br>33.0 | 232        | 227.7<br>228.7 | 44.5<br>44.5 | 292        | 287.6          |              |
| 54       | 53.0         |            | 113        | 111.9          |              | 174        | 170.8          |              | 234        | 229.7          | 44.6         | 294        | 288.6          |              |
| 55       | 54.0         |            | 115        | 112.9          |              |            | 171.8          | 35.4         | 235        | 230.7          | 44.8         | 295        | 289.6          |              |
| 56       | 55.0         |            | 116        | 113.9          |              | 176        | 172.8          | 33.6         | 236        | 231.7          | 45.0         | 296        | 290.6          |              |
| 57       | 56.0         |            | 117        | 114.9          |              | 177        | 173.7          | 33.8         | 237        | 232.6          | 45.2         | 297        | 291.5          |              |
| 58       | 56.9         |            | 118        | 115.8          |              | 178        | 174.7          | 34.0         | 238        | 233.6          | 45.4         | 298        | 292.5          |              |
| 59       | 57.9         |            | 119        | 116.8          |              | 179        | 175.7          | 94.2         | 239        | 294.6          | 45.6         | 299        | 299.5          |              |
| 60       | 58.9         | 11.4       | 120        | 117.8          | 28.9         | 180        | 176.7          | 34.3         | 240        | 235.6          | 45.8         | 300        | 294.5          |              |
| Dist.    | Dep.         | D.Lat      | Dist.      | Dep.           | D.lat        | Dist.      | Dep.           | D. Lat       | Dist.      | Dep.           | D. Lat       | Dist.      | Dep.           | D.Lat        |

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

|            |              |              |          |                |       | 1          | 2 Deg          | rees.        |            |                |       |            |                          |
|------------|--------------|--------------|----------|----------------|-------|------------|----------------|--------------|------------|----------------|-------|------------|--------------------------|
| Dist.      | D.Lat        | Dep.         | Dist.    | DLat           | Dep.  | Dist.      | D.Lat          | Dep.         | Dist.      | D.Lat          | Dep.  | Dist.      | D.Lat, Dep.              |
| 1          | 1.0          | 0.2          | 61       | 59.7           | 12.7  | 121        | 118.4          | 25.2         | 181        | 177.0          | 37.6  | 241        | 235.7,50.1               |
| 2          | 2.0          | 0.4          | 62       | 60.6           |       | 122        | 119.3          | 25.4         | 182        | 178.0          | 37.8  | 242        | 236.750.3                |
| 8          | 2.9          | 0.6          |          | 61.6           |       | 123        | 120.3          | 25.6         | 183        | 179.0          |       | 243        | 237.750.5                |
| 4          | 8.9          | 0.8          |          | 62.6           |       | 124        | 121.3          | 25.8         | 184        | 180.0          |       | 244        | 238.7.50.7               |
| 5          | 4.9          | 1.0          |          | 63.6           |       | 125        | 122.3          | 26.0         | 185        | 181.0          |       | 245        | 239.650.9                |
| 6          | 5.9<br>6.8   | 1.2          | 66<br>67 | 64.6<br>65.5   |       | 126<br>127 | 123.2<br>124.2 | 26.2<br>26.4 | 186<br>187 | 181.9<br>182.9 | 38.7  | 246<br>247 | 240.651.1<br>241.651.4   |
| 8          | 7.8          | 1.7          | 68       | 66.5           |       | 128        | 125.2          | 26.6         | 188        | 183.9          |       | 248        | 242.651.6                |
| 9          | 8.8          | 1.9          | 69       | 67.5           |       | 129        | 126.2          | 26.8         | 189        | 184.9          |       | 249        | 243.651.8                |
| 10         | 9.8          | 2.1          | 70       | 68.5           |       | 130        | 127.2          | 27.0         | 190        | 185.8          |       |            | 244.552.0                |
| 11         | 10.8         | 2.3          | 71       | 69.4           | 14 8  | 131        | 128.1          | 27.2         | 191        | 186.8          | 39.7  | 251        | 245.5 52.2               |
| 12         | 11.7         | 2.5          | 72       | 70.4           |       | 132        | 129.1          | 27.4         | 192        | 187.8          | 39.9  | 252        | 246.552.4                |
| 13         | 12.7         | 2.7          | 73       | 71.4           |       | 133        | 130.1          | 27.7         | 193        | 188.8          |       | 253        | 247.5 52.6               |
| 14         | 13.7         | 2.9          | 74       | 72.4           | 15.4  | 134        | 131.1          | 27.9         | 194        | 189.8          | 40.3  | 254        | 248.4 52.8               |
| 15         | 14.7         | 3.1          | 75       | 73 4           |       | 135        | 132.0          | 28.1         | 195        | 190.7          | 40.5  | 255        | 249.4 5S.0               |
| 16         | 15.7         | 3.3          | 76       |                | 15.8  | 136        | 133.0          | 28.3         | 196        | 191.7          |       |            | 250.4 53.2               |
| 17         | 16.6         | 3.5          | 77       | 75.3           |       | 137        | 134.0          | 28.5         | 197        | 192.7          | 41.0  | 257        | 251.4 53.4               |
| 18         | 17.6         | 3.7          | 78       | 76.3           |       | 138        | 135.0          | 28.7         | 198        | 193.7          |       | 258        | 252.4 53.6               |
| 19<br>20   | 18.6<br>19.6 | 4.0<br>4.2   | 79<br>80 | 77.3           | 16.6  | 139        | 136.0<br>136.9 | 28.9<br>29.1 | 199<br>200 | 194.7<br>195.6 | 41.4  | 259<br>260 | 253.3 53.8<br>254.3 54.1 |
| 20         | II           | 4.2          |          | ·              |       | 140        |                | 25.1         | <u>'</u>   |                |       |            | ·                        |
| 21         | 20.5         | 4.4          | 81       |                | 16.8  | 141        | 137.9          | 29.3         | 201        | 196.6          | 41.8  | 261        | 255.9 54.9               |
| 22         | 21.5         | 4.6          | 82       |                | 17.0  | 142        | 138.9          | 29.5         | 202        | 197.6          |       | 262        | 256.3 54.5               |
| 23         | 22.5         | 4.8          | 83       | 81.2           |       | 143        | 139.9          | 29.7         | 203        | 198.6          |       | 263        | 257.3 54.7               |
| 24<br>25   | 23.5<br>24.5 | 5.0<br>5.1   |          | 82.2<br>83.1   |       | 144        | 140.9          | 29.9<br>30.1 | 204        | 199.5          |       | 264<br>265 | 258.2 54.9<br>259.2 55.1 |
| 26         | 25.4         | 5.4          | 86       |                | 17.9  | 146        | 142.8          | 30.4         | 206        | 201.5          |       | 266        | 260.2 55.3               |
| 27         | 26.4         | 5.6          |          | 85.1           |       | 147        | 143.8          | 30.6         | 207        | 202.5          | 1     | 267        | 261.255.5                |
| 28         | 27.4         | 5.8          |          |                | 18.3  | 148        | 144.8          | 30.8         | 208        | 203.5          |       | 268        | 262.1 55.7               |
| 29         | 28.4         | 6.0          |          | 87.1           | 18.5  | 149        | 145.7          | 31.0         | 209        | 204.4          | 43.5  | 269        | 263.1 55.9               |
| 30         | 29.3         | 6.2          | 90       | 88.0           | 18.7  | 1.50       | 146.7          | 31.2         | 210        | 205.4          | 43.7  | 270        | 264.1 56.1               |
| 31         | 30.3         | 6.4          | 91       | 89.0           | 18.9  | 151        | 147.7          | 31.4         | 211        | 206.4          | 43.9  | 271        | 265.1 56.3               |
| 32         | 81.3         | 6.7          | 92       | 90.0           | 19.1  | 152        | 148.7          | 31.6         | 212        | 207.4          | 44.1  | 272        | 266.156.6                |
| 33         | 32.3         |              |          |                | 19.3  | 153        | 149.7          | 31.8         | 213        | 208.3          |       | 273        | 267.056.8                |
| 34         | 33.3         | 7.1          | 94       |                | 19.5  | 154        | 150.6          | 32.0         | 214        | 209.3          |       | 274        | 268.057.0                |
| 35         | 34.2         | 7.3          |          |                | 19.8  | 155        | 151.6          | 32.2         | 215        | 210.3          |       |            | 269.057.2                |
| 36         | 35.2<br>36.2 | 7.5          | 96<br>97 | 93.9           | 20.0  | 156<br>157 | 152.6          | 32.4         | 216<br>217 | 211.3          |       | 276<br>277 | 270.057.4                |
| 37<br>38   | 37.2         | 7.9          | 98       |                | 20.4  | 158        | 153.6<br>154.5 | 32.6<br>32.9 | 218        | 213.2          |       |            | 270.9 57.6<br>271.9 57.8 |
| 39         | 38.1         | 8.1          | 99       |                | 20.6  | 159        | 155.5          | 33.1         | 219        | 214.2          |       | 279        | 272.958.0                |
| 40         | 39.1         | 8.8          | 100      |                | 20.8  | 160        | 156.5          | 38.3         | 220        | 215.2          |       | 280        | 273.958.2                |
| 41         | 40.1         | 8.5          | 101      | 98.8           | 21.0  | 161        | 157.5          | 33.5         | 221        | 216.2          | 45.9  | 281        | 274.9 58.4               |
| 42         | 41.1         | 8.7          | 102      | 99.8           |       | 162        | 158.5          | 33.7         | 222        | 217.1          | 46.2  | 282        | 275.858.6                |
| 43         | 42.1         | 8.9          | 103      | 100.7          |       | 163        | 159.4          | 33.7         | 223        | 218.1          | 46.4  | 285        | 276.8 58.8               |
| 44         | 43.0         |              | 104      | 101.7          |       | 164        | 160.4          | 34.1         | 224        | 219.1          | 46.6  | 284        | 277.8 59.0               |
| 45         | 44.0         |              |          | 102.7          |       | 165        | 161.4          | 34.3         | 225        | 220.1          | 46.8  | 285        | 278.8 59.3               |
| 46         | 45.0         |              |          | 103.7          |       | 166        | 162.4          | 84.5         | 226        | 221.1          | 47.0  |            | 279.8 59.5               |
| 47         | 46.0         | 9.8          | 107      | 104.7          |       | 167        | 163.4          | 34.7         | 227        | 222.0          |       | 287        | 280.7.59.7               |
| 48<br>49   | 47.0<br>47.9 | 10.0<br>10.2 | 108      | 105.7<br>106.6 |       | 168        | 164.8          | 34.9         | 228        | 223.0          |       | 288        | 281.7.59.9<br>282.7.60.1 |
| 50         | 48.9         | 10.2         | 1109     | 107.6          |       | 169<br>170 | 165.3<br>166.3 | 35.1<br>35.3 | 229<br>230 | 224.0<br>225.0 |       | 289<br>290 | 283.7,60.3               |
| II         |              |              |          |                |       |            |                |              |            |                |       |            |                          |
| 51         | 49.9         | 10.6         | 111      | 108.6          |       | 171        | 167.3          | 35.6         | 231        | 226.0          |       | 291        | 284.6.60.5               |
| , 52<br>53 | 50.9<br>51.8 |              |          | 109.6<br>110.5 |       |            | 168.2          |              |            | 226.9          |       |            | 285.660.7                |
| 54         | 52.8         |              |          | 111.5          |       | 173<br>174 | 169.2<br>170.2 | 36.0<br>36.2 | 233<br>234 | 227.9<br>228.9 |       |            | 286.6.60.9               |
| 55         | 53.8         | 11.4         | 115      | 112.5          |       | 175        | 171.2          | 36.4         | 235        | 229.9          |       |            | 288.661.3                |
| 56         | 54.8         |              |          | 113.5          |       | 176        | 172.2          | 36.6         | 236        | 230.8          |       | н          | 289.561.5                |
| 57         | 55.8         | 11.9         | 117      | 114.4          |       | 177        | 173.I          | 36.8         | 237        | 231.8          |       |            | 290.561.7                |
| 58         | 56.7         |              |          | 115.4          |       |            | 174.1          | 37.0         | 238        | 232.8          | 49.5  | 298        | 291.562.0                |
| 59         | 57.7         | 12.3         |          | 116.4          |       | 179        | 175.1          | 37.2         | 239        | 233.8          |       |            | 292.562.2                |
| 60         | 58.7         |              |          | 117.4          | I     |            | 176.1          | 37.4         | 240        | 234.8          | 49.9  | 300        | 293.462.4                |
| Dist.      | Dep.         | D.Lat        | Dist.    | Dep.           | D.lat | Dist.      | Dep.           | DLat         | Dist.      | Dep.           | D.Lat | Dist.      | Dep. D.Lat               |
|            |              |              |          |                | `     | 7          | 8 Deg          | rees.        |            |                |       |            |                          |

### TABLE XIII.

| i        |              |              |          |                |        |            | 3 Deg          |              |            |                |               |                 |                |       |
|----------|--------------|--------------|----------|----------------|--------|------------|----------------|--------------|------------|----------------|---------------|-----------------|----------------|-------|
| Dist.    | D.Lat        | Dep.         | Dist.    | D.Lat          | Dep.   | Dist.      | D.Lat          | Dep.         | Dist.      | D.Lat          | Dep.          | Dist.           | D.Lat          | Dep.  |
| 1        | 1.0          | 0.2          | 61       | 59.4           | 13.7   |            | 117.9          | 27.2         | 181        | 176.4          | 40.7          | 241             | 234.8          | 54.2  |
| 2        | 1.9          | 0.4          | 62       | 60.4           |        | 122        | 118.9          | 27.4         | 182        | 177.9          | 40.9          |                 | 235.8          |       |
| 3 4      | 2.9<br>3.9   | 0.7          | 63<br>64 | 61.4<br>62.4   |        |            | 119.8          | 27.7<br>27.9 | 183<br>184 | 178.3<br>179.3 | 41.2          |                 | 236.8<br>237.7 |       |
| 5        | 4.9          | 1.1          | 65       | 63.3           |        |            | 120.8<br>121.8 | 28.1         | 185        | 180.3          | 41.4          |                 | 238.7          |       |
| 6        | 5.8          | 1.3          | 66       | 64.3           |        |            | 122.8          | 28.3         | 186        | 181.2          | 41.8          |                 | 239.7          |       |
| 7        | 6.8          | 1.6          | 67       | 65.3           |        | 127        | 123.7          | 28.6         | 187        | 182.2          | 42.1          |                 | 240.7          |       |
| 8        | 7.8<br>8.8   | 1.8<br>2.0   | 68       | 66.3           |        |            | 124.7          | 28.8         | 188        | 183.2          | 42.3          | 248             | 241.6<br>242.6 |       |
| 9<br>10  | 9.7          | 2.2          | 70       | 67.2<br>68.2   |        | 129<br>130 | 125.7<br>126.7 | 29.0<br>29.2 | 189<br>190 | 184.2<br>185.1 | 42.5<br>42.7  | 249<br>250      | 243.6          |       |
|          |              |              |          |                |        |            |                |              |            | !              | <del></del> - |                 |                |       |
| 11<br>12 | 10.7         | 2.5<br>2.7   | 71<br>72 | 69.2<br>70.2   |        |            | 127.6<br>128.6 | 29.5<br>29.7 | 191<br>192 | 186.1<br>187.1 | 43.0<br>43.2  | 251<br>252      | 244.6<br>245.5 |       |
| 13       | 12.7         | 2.9          | 73       | 71.1           |        |            | 129.6          | 29.9         | 193        | 188.1          | 43.4          |                 | 246.5          |       |
| 14       | 13.6         | 3.1          | 74       | 72.1           |        |            | 130.6          | 30.1         | 194        | 189.0          | 43.6          |                 | 247.5          |       |
| 15       | 14.6         | 3.4          | 75       | 73.1           |        |            | 131.5          | 30.4         | 195        | 190.0          | 43.9          | 255             | 248.5          |       |
| 16<br>17 | 15.6<br>16.6 | 3.6<br>3.8   | 76       | 74.1<br>75.0   |        |            | 132.5<br>133.5 | 30.6<br>30.8 | 196<br>197 | 191.0<br>192.0 | 44.1<br>44.3  | 256<br>257      | 249.4<br>250.4 |       |
| 18       | 17.5         | 4.0          | 78       | 76.0           |        |            | 134.5          | 31.0         | 198        | 192.9          | 44.5          |                 | 251.4          |       |
| 19       | 18.5         | 4.3          | 79       | 77.0           |        | 139        | 135.4          | 31.3         | 199        | 193.9          | 44.8          | 259             | 252.4          | 58.3  |
| 20       | 19.5         | 4.5          | 80       | 77.9           | 18.0   | 140        | 136.4          | 31.5         | 200        | 194.9          | 45.0          | 260             | 253.3          | 58.5  |
| 21       | 20.5         | 4.7          | 81       | 78.9           |        | 141        | 137.4          | 31.7         | 201        | 195.8          | 45.2          | 261             | 254.3          |       |
| 22       | 21.4         |              | 82       | 79.9           |        |            | 138 4          | 31.9         | 202        | 196.8          | 45.4          |                 | 255.3          |       |
| 23<br>24 | 22.4<br>23.4 | 5.2<br>5.4   | 83       | 80.9<br>81.8   |        |            | 139.3          | 32.2<br>32.4 | 203        | 197.8          | 45.7<br>45.9  | 263<br>264      | 256.3<br>257.2 |       |
| 25       | 24.4         | 5.6          | 85       | 82.8           |        | 144<br>145 | 140.3<br>141.3 |              | 204<br>205 | 198.8<br>199.7 | 46.1          | 265             | 258.2          |       |
| 26       | 25.3         | 5.8          | 86       | 83.8           |        | 146        | 142.3          | 32.8         | 206        | 200.7          | 46.3          |                 | 259.2          |       |
| 27       | 26.3         | 6.1          | 87       | 84.8           |        | 147        | 143.2          | <b>3</b> 3.1 | 207        | 201.7          | 46.6          | 267             | 260.2          |       |
| 28<br>29 | 27.3         | 6.3          | 88       | 85.7           |        | 148        | 144.2          | 33.3         | 208        | 202.7          | 46.8          | 268             | 261.1<br>262.1 |       |
| 30       | 28.3<br>29.2 | 6.5          | 89       | 86.7<br>87.7   |        | 149<br>150 | 145.2<br>146.2 | 33.5<br>33.7 | 209<br>210 | 203.6<br>204.6 | 47.0<br>47.2  |                 | 263.1          |       |
|          |              |              |          |                |        |            |                |              |            | !              | '             | <u> </u>        |                |       |
| 31<br>32 | 30.2<br>31.2 | 7.0          | 91       | 88.7           |        | 151<br>152 | 147.1<br>148.1 | 34.0<br>34.2 | 211<br>212 | 205.6<br>206.6 | 47.5<br>47.7  | 271<br>272      | 264.1<br>265.0 |       |
| 33       | 32.2         | 7.4          | 93       | 90.6           |        | 153        | 149.1          | 34.4         | 213        | 207.5          | 47.9          | 273             | 266.0          |       |
| 34       | 33.1         | 7.6          | 94       | 91.6           |        | 154        | 150.1          | 34.6         | 214        | 208.5          | 48.1          | 274             | 267.0          |       |
| 35       | 34.1         | 7.9          | 95       |                | 21.4   | 155        | 151.0          |              | 215        | 209.5          | 48.4          | 275             | 268.0          |       |
| 36<br>37 | 35.1<br>36.1 | 8.1<br>8.3   | 96       | 93.5<br>94.5   |        | 156<br>157 | 152.0<br>153.0 |              | 216<br>217 | 210.5<br>211.4 | 48.6<br>48.8  | 276             | 268.9<br>269.9 |       |
| 38       | 37.0         |              | 98       |                | 22.0   | 158        | 154.0          |              | 218        | 212.4          | 49.0          | 278             | 270.9          |       |
| 39       | 38.0         |              | 99       | 96.5           | 22.3   | 159        | 154.9          |              | 219        | 213.4          | 49.3          | 279             | 271.8          |       |
| 40       | 39.0         | 9.0          | 100      | 97.4           | 22.5   | 160        | 155.9          | 36.0         | 220        | 214.4          | 49.5          | 280             | 272.8          | 63.0  |
| 41       | 39.9         |              | 101      |                | 22.7   | 161        | 156.9          | 36.2         | 221        | 215.3          | 49.7          | 281             | 273.8          |       |
| 42       | 40.9         |              | 102      |                | 22 9   | 162        | 157.8          | 36.4         | 222        | 216.3          | 49.9          | 282             | 274.8          |       |
| 43<br>44 | 41.9         | 9.7          | 103      | 100.4          |        | 163<br>164 | 158.8<br>159.8 | 36.7<br>36.9 | 223<br>224 | 217.8<br>218:3 | 50.2<br>50.4  | 283<br>284      | 275.7<br>276.7 |       |
| 45       |              | 10.1         | 105      | 102.3          |        | 165        | 160.8          | 37.1         | 225        | 219.2          | 50.6          | 285             | 277.7          |       |
| 46       | 44.8         | 10.3         | 106      | 103.3          | 23.8   | 166        | 161.7          | 37.3         | 226        | 220.2          | <i>5</i> 0.8  | 286             | 278.7          |       |
| 47       |              | 10.6         | 107      | 104.3          |        | 167        | 162.7          | 37.6         | 227        | 221.2          |               | 287             | 279.6<br>280.6 |       |
| 48<br>49 |              | 10.8<br>11.0 | 108      | 105.2<br>106.2 |        | 168<br>169 | 163.7<br>164.7 | 37.8<br>38.0 | 228        | 222.2<br>223.1 | 51.8<br>51.5  | 288<br>289      | 281.6          |       |
| 50       |              | 11.2         | 110      | 107.2          |        | 170        | 165.6          |              | 230        | 224.1          | 51.7          | 290             | 282.6          |       |
| 51       | 49.7         | 11.5         | 111      | 108.2          |        | 171        | 166.6          |              | 231        | 225.1          | 52.0          | 291             | 283.5          | 65.5  |
| 52       | 50.7         | 11.7         | 112      | 109.1          | 25.2   | 172        | 167.6          | 38.7         | 232        | 226.1          | 52.2          | 292             | 284.5          | 65.7  |
| 53       | 51.6         | 11.9         |          | 110.1          | 25.4   |            | 168.6          | 38.9         |            | 227.0          | 52.4          |                 |                |       |
| 54       |              | 12.1         |          | 111.1          |        |            | 169:5          |              | 234        | 228.0          |               |                 | 286.5<br>287.4 |       |
| 55<br>56 |              | 12.4<br>12.6 |          | 112.1          |        |            | 170.5          |              | 235<br>236 | 229.0<br>230.0 |               |                 | 288.4          |       |
| 57       |              | 12.8         | 117      | 114.0          |        |            | 172.5          |              | 237        | 230.9          |               |                 | 289.4          | 66.8  |
| 58       | 56.5         | 13.0         | 118      | 115.0          |        | 178        | 173.4          | 40.0         |            | 231.9          |               |                 | 290.4          |       |
| 59<br>60 |              | 13.3         | 119      | 116.0          |        |            | 174.4          |              | 239<br>240 | 232.9<br>233.8 |               |                 | 291.9<br>292.9 |       |
|          | l            | 13.5         | . 120    | 116.9          |        |            | 175.4          |              | 11         | _'             |               |                 | .              |       |
| Dist.    | Dep.         | 'D.Lat       | 4 Dist   | Dep.           | ID.lat |            |                |              | Dist       | Dep.           | DLat          | Dist.           | Dep.           | D.Lat |
|          |              |              |          |                |        | 7          | 77 Deş         | теев.        |            |                |               | an hoperature ( | ·              |       |

TABLE XIII.

14 Degrees. D.Lat Dep. D.Lat) Dep. Dist. D.Lat Dist. Dep. Dist. Dist. D.Lat Dep. Dist. D.Lat Dep. 233.8 58.3 1.0 0.2 117.4 61 59.2 14.8 121 29.3 181 175.6 43.8 941 234.8 58.5 242 1.9 0.5 62 60.2 15.0 29.5 176-6 44.0 2 122 118.4 182 235.8 58.8 61.1 15.2 62.1 15.5 63.1 15.7 123 3 **Ż**.9 0.7 63 119.3 29.8 177.6 44.3 243 183 236.8 59.0 244 4 3,9 1.0 64 124 120.8 30.0 184 178.5 44.5 237.7 59.3 4.9 1.2 245 5 65 125 121.3 30.2 185 179.5 44.8 238.7 59.5 6 5.8 1.5 66 64.0 16.0 126 122.5 30.5 186 180.5 45.0 246 239.7 59.8 6.8 1.7 67 65.0 16.2 127 123.2 30.7 187 181.4 45.2 247 240.6 60.0 8 7.8 1.9 68 66.0 16.5 124.2 188 182.4 45.5 248 128 31.0 241.6 60.2 9 8.7 2.2 69 67.0 16.7 129 125.2 31.2 189 183.4 45.7 249 9 7 250 242.6 60.5 10 2.4 70 67.9 16.9 130 126.1 31.4 190 184.4 46.0 251 243.5 60.7 11 12 10.7 2.7 71 68.9 17.2 31.7 185.3 131 127.1 191 46.2 69.9 17.4 244.5 61.0 11.6 2.9 72 128.1 31.9 192 186.3 46.4 252 132 245.5 61.2 12.6 3.1 73 70.8 17.7 187.3 46.7 253 13 133 129.0 32.2 193 246.5 61.4 254 74 71.8 17.9 32.4 188.2 14 13.6 3.4 134 130.0 194 46.9 72.7 18.1 73.7 18.4 74.7 18.6 247.4 61.7 15 14.6 3.6 75 131.0 32.7 195 189.2 47.2 255 135 248.4 61.9 16 15.5 3.9 76 32.9 190.2 47.4 256 136 132.0 196 257 249,4 62.2 77 17 16.5 4.1 137 132.9 33.1 197 191.1 47.7 138.9 192.1 250.3 62.4 18 17.5 4.4 78 75.7 18.9 138 33.4 198 47.9 258 251.3 62 7 19 18.4 4.6 79 76.7 19.1 139 134.9 33.6 199 193.1 48.1 259 260 25 ? . 3 62.9 20 19.4 4.8 80 77.6 19.4 140 135.8 33.9 200 194.1 48.4 21 20.4 78.6 19.6 34.1 195.0 261 253.2 63.1 5.1 141 201 48.6 81 136.8 254.2 63.4 22 21.3 5.3 82 79.6 19.8 142 137.8 34.4 202 196.0 48.9 262 255.2 63.6 263 23 22.3 5.6 83 80.5 20.1 143 138.8 34.6 203 197.0 49.1 256.263.9 81.5 20.3 34.8 197.9 49.4 264 24 23.3 5.8 84 144 139.7204 25 24.3 6.0 85 82.5 20.6 145 140.7 35.1 205 198.9 49.6 265 257.1 64.1 83.4 20.8 266 258.1 64.4 26 25.2 6.3 86 146 141.7 35.3 206 199.9 49.8 35.6 259.1 64.6 27 26.2 84.4 21.0 147 142.6 207 50.1 267 87 200.9 6.5 50.3 260.0 64.8 28 27.2 6.8 88 85.4 21.3 148 143.6 35.8 208 201.8 268 36.0 269 261.0 65.1 29 28.1 86.4 21.5 149 209 7.0 89 144.6 202.8 50.6 145.5 262.0 65.3 30 29.1 7.3 90 87.3 21.8 150 36.3 210 203.8 50.8 270 31 30.1 7.5 91 88.3 22.0 151 146.5 36.5 211 204.7 51.0 271 263.0 65.6 31.0 7.7 89.3 22.3 152 147.5 36.8 212 205.7 51.3 272 263.9 65.8 32 92 90.2 22.5 32.0 8.0 153 148.5 37.0 213 273 264.9 66.0 33 93 206.7 51.5 91.2 22.7 274 265.9 66.3 34 33.0 8.2 94 154 149.4 37.3 214 207.6 51.8 266.8 66.5 92.2 23.0 35 34.0 8.5 95 155 150.4 37.5 215 208.6 52.0 275 93.1 23.2 151.4 216 209.6 52.3 267.8 66.8 34.9 8.7 96 156 37.7 276 36 38.0 268.8 67.0 97 94.1 23.5 157 152.3 217 52.5 277 37 35.9 9.0 210.6 278 269.7 67.3 270.7 67.5 153.3 38.2 52.7 38 36.9 9.2 98 95.1 23.7 158 218 211.5 37.8 38.5 39 9.4 99 96.1 24.0 159 154.3 219 212.5 53.0 279 271.7 67.7 40 38.8 9.7 100 97.0 24.2 160 155.2 38.7 220 213.5 53.2 280 39.8 9.9 98.0 24.4 214.4 272.7 68.0 41 101 161 156.2 38.9 221 53.5 281 99.0 24.7 40.8 10.2 39.2 222 282 273.6 68.2 42 102 162 157.2 215.4 53.7 43 41.7 10.4 103 99.9 24.9 163 158.2 39.4 223 216.4 53.9 283 274.6 68.5 275.6 68.7 44 42:7 10.6 104 100.9 25.2 164 159.1 39.7 224 217.3 54.2 284 101.9 25.4 45 43.7 10.9 105 165 160.1 39.9 225 218.3 54.4 285 276.5 68.9 277.5 69.2 46 44.6 11.1 106 102.9 25.6 166 161.1 40.2 226 219.3 54.7 286 278.5 69.4 45.6 11.4 103.8 25.9 167 40.4 227 54.9 287 47 107 162.0 220.3 48 46.6 11.6 108 104.8 26.1 168 163.0 40.6 228 221.2 55.2 288 279.4 69.7 280.4 69.9 49 47.5 11.9 109 105.8 26.4 169 164.0 40.9 229 222.255.4 289 106.7 26.6 170 230 290 281 .4 70.2 50 48.5 12.1 165.0 41.1 223.2 55.6 110 111 51 49.5 12.3 107.7 26.9 171 165.9 41.4 231 224.1 55.9 291 282.4 70.4 108.7 27.1 292 283.3 70.6 52 50.5 12.6 112 172 166.9 41.6 232 225.1 56.1 109.6 27.3 51.4 12.8 293 53 113 173 167.9 41.9 233 226.1 56.4 284.3 70.9 110.6 27.6 52.4 13.1 158.8 42.1 56.6 54 114 174 234 227.0 294 285.3 71.1 55 53.413.8 115 111.6 27.8 169.8 42.3 235 295 286.2 71.4 175 228.0 56.9 287.2 71.6 56 54.3 13.5 170.8 236 57.1 116 112,6 28.1 176 42.6 229.0 296 288.2 71.9 289.1 72.1 57 55.8 13.8 117 113.5 28.3 177 171.7 42.8 237 230.0 57.3 297 56.3 14.0 172.7 58 118 114.5 28.5 178 43.1 238 230.9 57.6 298 115.5 28.8 290.1 72.3 59 57.2 14.3 119 179 173.7 239 57.8 299 43.3 231.9 58.2 14.5 60 120 116.4 29.0 180 174.7 43.5 240 232.9 58.1 300 291.172.6 Dist. | Dep. |D.Lat | Dist. | Dep. |D.Lat 76 Degrees.

### TABLE XIII.

### TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

|  |       |             | Ditoi |          | , .     | 1     | E Das  | 2000  |       |         | ×     |       |          |              |
|--|-------|-------------|-------|----------|---------|-------|--------|-------|-------|---------|-------|-------|----------|--------------|
| 1 1.0 0.5 61 58.9 15.8 121 116.9 31.9 181 174.8 46.8 241 232.8 624. 4 3.9 1.0 6 55.9 16.0 122 117.8 31.6 182 175.8 47.4 242 233.8 623.6 48.3 2.9 0.8 63 60.9 16.3 13.1 18.8 31.8 183 176.8 47.4 243 233.8 623.6 63.7 48.1 18.6 13.8 18.3 176.8 47.4 243 233.8 623.6 63.7 48.1 18.6 13.8 18.3 176.8 47.4 243 233.8 623.6 63.6 18.1 18.6 13.8 18.3 176.8 47.4 243 235.7 653.2 65.6 18.8 18.3 176.8 47.4 243 235.7 653.2 65.6 18.8 18.3 17.5 18.5 18.8 18.5 18.5 17.5 47.9 245 236.7 653.2 65.8 16.6 18.4 17.7 19.2 19.2 18.5 18.5 18.5 18.5 18.5 18.5 18.5 18.5  | Dist. | D I at Day  | D'-   | D. Carlo |         |       |        |       | D:-A  | ID I al | Den   | D:    | 175 1    | Dan          |
| 2         1.9         0.5         6.9         59.9         96.0         122         117.8         31.6         182         17.8         4         2.9         2.93.8         62.6         96.9         16.3         13.1         18.8         31.7         77.7         47.6         224         235.7         76.8         2.9         2.9         2.9         18.7         17.7         47.6         244         235.7         76.8         2.6         6.8         18.6         18.6         6.8         6.8         17.1         18.9         121.7         32.6         185         17.7         47.1         242         236.6         66.7         77.6         18.8         6.8         66.7         17.6         18.1         180.1         18.1         180.6         33.1         188         181.6         48.9         249         238.6         66.9         27.7         61.8         18.1         180.1         28.7         18.1         180.6         18.1         180.1         28.2         18.1         180.6         33.1         188         181.6         48.9         249         240.5         564.2         290.5         644.7         19.0         28.2         240.5         644.7         18.1         18.2<  | Dist. | D.Lat Dep.  | D18t. | D. Lat D | ep.     | Dist. | D. Lat | Dep.  | Dist. | D.Lat   | Dep.  | Dist. | D.Lat    | Dep.         |
| 8 2, 9 0, 8 63 60, 9 16.3 123 118.8 31.8 183 176, 8 47.4 948 124, 768.9 1 4 3.9 10, 0 64 61.8 16.6 128 10.8 125 120.7 32.4 185 178.7 47.9 245 226.7 65.4 6 5.8 11.8 67 64.7 17.3 127 122.7 32.9 187 180.6 48.4 247 228.6 65.9 9 8 7.7 9.1 68 67 64.7 17.3 127 122.7 32.9 187 180.6 48.4 247 228.6 66.9 9 9 8.7 9.3 69 66.6 17.9 129 124.6 33.4 189 182.6 48.9 249 220.5 64.4 10 10 9.7 2.6 70 67.6 18.1 130 125.6 33.4 189 182.6 48.9 249 220.5 64.4 11 10 10.6 2.8 71 68.6 18.4 131 126.5 33.4 189 182.6 48.9 249 220.5 64.4 12 11 10 10.6 2.8 71 68.6 18.4 131 126.5 33.9 191 184.5 49.7 252 243.4 65.0 12 11.6 3.1 72 69.5 18.6 182 127.5 34.2 192 185.5 49.7 252 243.4 65.0 12 11.6 3.1 72 69.5 18.6 182 127.5 34.2 192 185.5 49.7 252 243.4 65.2 14 13.5 3.6 74 71.5 19.2 134 129.4 34.7 194 187.4 50.2 254 245.3 65.7 15 14.5 3.9 75 72.4 19.4 185 130.4 34.7 194 187.4 50.2 254 245.3 65.7 15 14.5 3.9 75 72.4 19.4 18.5 130.4 34.7 194 187.4 50.2 254 245.3 65.7 16 15.5 4.1 76 78.4 19.7 186 131.4 35.2 194 188.4 50.5 25 264.3 66.3 18 18 18 18.4 18.5 18.4 18.5 18.4 18.5 18.5 18.4 18.5 18.5 18.4 18.5 18.5 18.4 18.5 18.5 18.5 18.5 18.5 18.5 18.5 18.5   | ı     | 1.0 0.3     | 61    | 58.915   | 5.8     | 121   | 116.9  | 31.3  | 181   | 174.8   |       |       |          |              |
| 4 8.9 1.0 64 61.8 16.6 124 119.8 92.1 184 177.7 47.6 244 285.768.2 65 4.8 1.6 66 62.8 16.8 125 120.7 92.4 185 177.7 47.6 144 245 235.768.2 66 5.8 1.6 66 63.8 17.1 126 121.7 32.6 186 179.7 48.1 246 237.663.7 7 6.8 1.8 67 67.6 17.6 189 123.6 33.1 188 181.6 48.4 7 947 238.6 63.7 9 8.7 7 2.6 70 67.6 18.1 130 125.6 33.4 189 182.6 48.7 948 299.5 64.2 9 8.7 7 2.6 70 67.6 18.1 130 125.6 33.4 189 182.6 48.7 948 299.5 64.2 11 10 1.6 2.8 71 88.6 18.4 131 196.5 33.6 189 182.5 49.2 250 241.5 64.7 11 10.6 2.8 71 88.6 18.4 131 196.5 33.9 191 184.5 49.4 251 292.4 65.0 12 13 12.6 3.4 73 70.5 18.9 133 128.5 34.4 189 185.5 49.2 250 241.5 64.7 15 13 12 11.6 3.4 73 70.5 18.9 133 128.5 34.4 189 185.5 49.2 250 241.5 64.7 15 13 12 11.6 3.4 73 70.5 18.9 133 128.5 34.4 189 185.5 49.2 250 241.5 64.7 15 13 12 13 13 15 15 15 15 15 15 15 15 15 15 15 15 15  |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 5 4.8 1.3 65 62.8 16.8 125 120.7 32.4 185 178.7 47.9 24.5 226.768.4 6 5.8 1.8 67 64.7 17.5 127 129 124.6 237.6 68.9 9 8.7.7 2.3 69 66.6 17.9 129 124.6 23.4 189 182.6 48.7 248 239.5 64.2 9 8.7.7 2.3 69 66.6 17.9 129 124.6 23.4 189 182.6 48.7 248 239.5 64.2 19 8.7.7 2.3 69 66.6 17.9 129 124.6 23.4 189 182.6 48.7 248 239.5 64.2 11 1 1 10.6 2.8 71 68.6 18.4 131 126.5 23.4 189 182.6 48.9 249 240.5 64.4 18.1 12.1 12.1 12.1 12.1 12.1 12.1 12.1   |       |             | 1     |          |         |       |        |       |       |         |       |       |          |              |
| 6 5.8 1.6 66 63.8   17.1   196   121.7   32.6   186   179.7   48.1   246   237.6   63.7   7 6.8   18.8   67 6.4   71.7   17.2   71.9   72.9   32.9   37.8   180.6   48.4   72.8   42.7   238.6   63.7   8 7.7   2.1   68   65.7   17.6   128   123.6   33.1   188   181.6   48.7   248   239.5   64.2   9 8.7   2.3   69   66.6   17.9   19.4   63.3   4   189   182.6   48.9   249.5   64.2   10   9.7   2.6   70   67.6   18.1   130   125.6   33.6   190   183.5   49.2   250   241.5   64.7   11   10.6   2.8   71   68.6   18.4   131   196.5   33.9   191   184.5   49.4   251   242.4   65.0   12   11.6   3.4   73   70.5   18.9   133   128.5   34.4   139.5   185.5   49.7   252   243.4   65.5   13   12.6   3.4   73   70.5   18.9   133   128.5   34.4   139.5   186.4   50.0   253   244.4   65.5   14   13.5   3.6   74   71.5   19.2   13.5   130.4   34.9   19.5   188.4   50.5   255   246.3   66.0   16   15.5   4.1   76   73.4   19.7   138   131.4   35.2   196.1   189.3   50.7   255   246.3   66.0   17   16.4   4.4   77   74.4   19.7   138   131.4   35.5   19.5   188.4   50.5   255   246.3   66.5   18   17.4   4.7   78   75.3   20.2   138   133.3   35.5   197   190.3   51.0   257   248.2   265.5   18   17.4   4.7   78   75.3   20.2   138   134.3   36.0   199   192.2   51.5   258   249.2   66.5   18   17.4   4.7   78   75.3   20.2   138   134.3   36.0   199   192.2   51.5   258   250.2   267.0   20   19.3   5.7   82   79.9   21.2   149   137.9   36.8   209   195.1   52.2   360.2   267.0   21   20.3   5.4   81   82.2   10.0   41   136.2   36.5   201   191.2   51.5   258   250.2   267.0   22   21.3   5.7   82   81.2   21.5   148   138.1   37.0   208   196.1   52.5   260.2   267.0   23   22.2   6.0   83   80.2   21.5   148   138.1   37.0   208   196.1   52.5   260.2   267.0   24   23.2   6.2   84   81.1   21.7   144   139.1   37.3   204   197.0   52.8   264   255.0   68.3   25   24.1   6.5   86   82.1   22.0   144   136.2   86.5   201   199.0   53.3   266   266.0   36.0   26   25.1   6.7   86   86.0   25.0   148   138.1   37.0   203   198. |       |             |       |          |         |       |        |       |       |         |       | 1     |          |              |
| 7 6.8 1.8 67 64.7   17.3   127   122.7   32.9   187   180.6   48.4   247   238.6   63.9   8 7.7   2.1   68   65.7   17.6   182   123.6   33.4   188   182.6   48.9   249   220.5   644.4   10   9.7   2.6   70   67.6   18.1   130   125.6   33.4   188   182.6   48.9   249   220.5   644.4   11   10.6   2.8   71   68.6   18.4   181   196.5   33.9   191   184.5   49.7   252   243.4   65.0   12   11.6   3.1   72   69.5   18.6   132   127.5   34.2   192   185.5   49.7   252   243.4   65.2   14   13.5   3.6   74   71.5   19.2   134   129.4   34.4   133   18.6   48.7   252   243.4   65.2   15   14.5   3.9   7.5   72.4   19.4   18.5   130.4   34.9   195   188.4   50.2   254   245.3   65.7   17   16.4   4.4   77   77.4   419.9   187   132.3   35.5   186   189.3   50.7   256   247.3   66.3   18   17.4   4.7   78   75.3   20.2   188   183.3   35.7   188   191.3   51.0   257   248.2   66.5   19   18.4   4.9   79   76.3   20.4   189   184.3   36.0   199   192.2   51.5   259   20.2   67.0   20   19.3   5.2   80   77.3   20.7   140   135.2   36.2   200   193.3   51.8   258   249.2   66.5   21   20.3   5.4   81   78.2   21.0   141   136.2   36.5   201   194.2   52.0   261   252.1   67.6   22   21.8   5.7   82   79.2   21.1   44   193.1   37.0   20.9   19.3   51.8   260   251.1   67.6   23   22.2   6.0   83   80.2   21.5   143   188.1   37.0   20.9   19.3   51.8   260   251.1   67.6   24   25.1   6.7   86   83.1   22.3   146   141.0   37.5   20.5   199.9   53.6   267   257.0   263.3   67.6   25   24.1   6.7   86   83.1   22.3   146   141.0   37.5   20.5   199.9   53.6   267   267.5   267.6   268.9   26   25.1   6.7   86   83.1   22.3   146   141.0   37.5   20.5   199.9   53.6   267   267.5   268.9   27   26.1   70.8   78.4   20.2   81.4   141.0   37.8   20.9   39.0   31.8   268   288.9   68.9   28   29.0   7.8   90   86.9   23.3   150   144.9   38.8   210   20.9   8.5   4.6   267   267.6   267.6   277.7   28   30.9   30.9   30.9   30.8   30.9   30.9   30.9   30.9   30.9   30.8   30.9   30.9   30.9   30.9   30.8   30.9   30.9   30.9 |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 8 7.7 2.1 68 65.7 17.6 128 123.6 33.1 188 181.6 48.7 248 229.5 64.2 9 8.7 2.3 69 66.6 17.9 129 124.6 33.4 189 182.6 48.9 249 240.5 64.7 11 10.6 2.8 71 68.6 18.1 130 125.6 33.6 190 183.5 49.2 250 241.5 64.7 11 10.6 2.8 71 68.6 18.4 131 196.5 33.9 191 184.5 49.4 251 224.4 65.0 12 11.6 3.1 72 99.5 18.6 132 127.5 34.2 192 185.5 49.2 250 241.5 64.7 13 13 12.6 3.4 73 70.5 18.9 133 128.5 34.4 133 186.4 50.0 253 224.4 465.5 14 13.5 3.6 74 71.5 19.2 134 129.4 34.7 133 186.4 50.0 253 224.4 465.5 14 13.5 3.9 75 72.4 19.4 195 130.4 34.9 195 188.4 50.5 255 246.3 66.0 16 15.5 4.1 76 73.4 19.7 136 181.4 35.2 196 189.3 50.7 256 247.3 66.3 18 17.4 4.7 78 75.3 20.2 183 133.3 35.7 198 191.3 51.2 258 249.2 66.8 18 18.1 4.9 79 76.3 20.4 189 194.3 86.0 199 192.2 51.5 259 250.2 67.8 66.3 19.1 18.4 18.7 18.5 18.5 18.5 18.9 19.3 51.0 257 248.2 66.8 19.1 18.4 18.7 18.5 18.5 18.5 18.5 18.5 18.5 18.5 18.5   |       |             |       |          |         |       |        |       | 1     |         |       |       |          |              |
| 9 8.7 2.3 69 66.6   17.9   129   124.6   33.4   189   182.6   48.9   249   240.564.7   11   10.6   2.8   71   68.6   18.4   181   196.5   33.9   191   184.5   49.2   250   241.5   64.7   12   11.6   3.1   79   69.5   18.6   189   197.5   34.2   192   185.5   49.7   259   243.4   65.0   12   11.6   3.1   79   69.5   18.6   189   197.5   34.2   192   185.5   49.7   259   243.4   65.0   13   12.6   3.4   73   70.5   18.9   183   128.5   34.4   193   186.4   50.0   253   244.4   65.5   14   13.5   3.6   74   71.5   19.2   134   129.4   34.7   194   187.4   50.2   254   245.3   65.7   15   14.5   3.9   75   72.4   19.4   135   130.4   34.9   195   188.4   50.5   255   246.3   65.7   17   16.4   4.4   77   74.4   19.9   137   139.3   35.5   197   190.3   51.0   256   247.3   66.3   18   17.4   4.7   78   75.3   20.2   138   133.3   35.7   198   191.3   51.2   258   249.2   26.8   19   18.4   4.9   79   76.3   20.4   139   184.3   36.0   199   192.2   51.5   259   250.2   67.0   19   19.3   5.2   80   77.3   20.7   140   135.2   36.8   202   195.1   52.9   250.2   267.0   19   23.2   6.2   84   81.1   21.7   144   139.1   37.3   204   197.0   59.8   264   255.0   68.8   17   24.1   6.5   6.5   85   82.1   22.0   145   140.1   37.5   205   199.0   35.3   266   256.0   68.8   17   25   24.1   6.5   85   82.1   22.0   145   140.1   37.5   205   200.9   53.8   266   256.0   68.8   17   26.1   70.7   87   84.0   22.5   147   142.0   38.0   20.7   159.0   35.3   266   256.0   68.8   18   27.0   77.2   88   86.0   23.0   149   143.9   38.6   209   201.9   31.5   266   256.0   68.8   19   29.9   8.0   91   87.9   23.6   151   145.9   39.1   211   203.8   54.6   271   261.8   70.1   261.8   271    |       |             |       |          |         |       |        |       | i     |         |       |       |          |              |
| 10   |       | 1           |       |          |         |       |        |       |       |         |       |       |          |              |
| 11   | 10    |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 12   11.6   3.1   72   69.5   18.6   192   127.5   34.2   192   185.5   49.7   252   243.4   65.5     13   12.6   3.4   73   70.5   18.9   193   128.5   34.4   193   186.4   50.0   253   244.4   65.5     14   13.5   3.6   74   71.5   19.2   134   129.4   34.7   194   187.4   50.2   254   245.3   65.7     15   14.5   3.9   75   72.4   19.4   135   130.4   34.9   195   188.4   50.5   255   246.3   66.5     17   16.4   4.4   77   74.4   19.9   137   139.3   35.5   197   190.3   51.0   257   248.2   66.5     18   17.4   4.7   78   75.3   20.2   138   133.3   35.7   198   19.3   51.2   258   249.2   66.8     19   18.4   4.9   79   76.3   20.4   139   184.3   36.0   199   192.2   51.5   259   250.2   67.0     19   13.5   5.2   80   77.3   20.7   140   135.2   36.2   200   193.2   51.8   260   251.1   67.3     12   20.3   5.4   81   78.2   21.0   141   134.2   36.5   201   194.2   52.0   261   252.1   67.3     12   20.3   5.4   81   78.2   21.0   141   134.2   36.5   201   194.2   52.0   261   252.1   67.8     12   20.3   5.4   81   78.2   21.0   141   134.2   36.5   201   194.2   52.0   261   252.1   67.8     12   20.3   5.4   81   78.2   21.0   141   134.2   36.5   201   194.2   52.0   261   252.1   67.8     13   22.2   6.2   84   81.1   21.7   144   139.1   37.3   204   197.0   52.8   264   255.0   68.5     25   24.1   6.5   85   82.1   22.0   145   140.1   37.5   205   198.0   55.1   265   256.0   68.5     25   24.1   6.5   88   88.1   22.0   145   140.1   37.5   205   198.0   55.1   266   256.9   68.8     27   26.1   7.0   87   84.0   22.5   147   142.0   38.0   2.7   199.9   53.6   267   257.0   68.3     29   28.0   7.5   89   86.0   23.0   149   143.9   38.6   209   201.9   54.1   269   259.8   69.4     29   28.0   7.5   89   86.0   23.0   149   143.9   38.6   209   201.9   54.1   269   259.8   69.4     29   28.0   7.8   89   84.7   25.4   188   13.5   146.8   39.9   21.2   20.8   54.6   277   260.8   69.8     29   29.0   7.8   89   89.2   28.6   155   146.8   39.9   21.2   20.6   56.2   277   26.8   279.2      |       | 10 6 0 9    | 71    |          | —-!'    | 101   | 100 5  |       | 101   | 104 5   | 40.4  | 053   | 040 4    | 65.0         |
| 18   12.6   3.4   73   70.5   8.9   193   128.5   34.4   193   186.4   50.0   25.5   244.4   65.5   15   14.5   3.9   75   72.4   19.4   185   130.4   34.9   195   188.4   50.5   25.5   246.3   66.0   16   15.5   4.1   76   73.4   19.7   186   131.4   35.2   196   188.3   50.7   256   247.3   66.5   18   17.4   4.7   78   75.3   20.2   198   131.4   35.3   197   190.3   51.0   257   248.2   66.5   18   17.4   4.7   78   75.3   20.2   198   133.3   35.7   198   191.3   51.2   258   249.2   66.5   18   17.4   4.9   76.3   20.7   140   135.2   36.2   200   193.3   51.0   257   258   249.2   66.5   20   193.3   5.2   258   249.2   66.5   20   193.3   5.2   258   249.2   26.5   22   21.3   5.7   82   79.2   21.2   142   137.2   36.8   20.2   195.1   55.3   250   251.1   67.3   22   22.2   23.5   7.7   82   80.2   21.5   143   138.1   37.0   203   194.2   52.0   262   253.1   67.8   252   24.1   6.5   85   82.1   22.0   145   140.1   37.5   205   198.0   53.1   265   256.0   68.6   265   25.1   6.7   86   85.1   22.0   145   140.1   37.5   205   198.0   53.1   265   256.0   68.6   265   25.1   67.0   86   85.1   22.3   146   141.0   37.8   206   199.0   53.3   266   255.9   96.3   259   29.2   75.8   29.2   259.8   260.0   28.2   27.1   70.0   27.2   28.8   28.0   29.2   29   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 14   13.5   3.6   74       74       71.5   19.2   134   129.4   34.7   194   187.4   50.2   254   246.3   66.0   15.5   4.1   76       75.7   72.4   19.4   185   130.4   34.9   195   188.4   50.5   255   246.3   66.0   17.1   16.4   4.4   77   74.4   19.9   137   132.3   35.5   197   190.3   51.0   257   248.2   66.3   17.1   16.4   4.7   77   74.4   19.9   137   132.3   35.5   197   190.3   51.0   257   248.2   66.3   19.1   18.4   4.9   79   76.3   20.4   139   184.3   36.0   199   192.2   51.5   259   250.2   67.0   19.1   19.1   19.1   19.1   19.1   19.1   19.1   19.1   19.1   19.1   19.1   19.2   25.1   19.2   25.1   19.2   25.2   26.2   250.2   67.0   20.1   19.4   25.2   26.2   250.2   67.0   25.2   24.1   6.5   83   80.2   21.5   143   138.1   37.0   20.3   196.1   52.3   26.2   253.1   67.8   25.2   24.1   6.5   85   82.1   22.0   145   140.1   37.8   20.4   197.0   52.8   26.2   255.0   68.3   25.2   24.1   6.5   85   82.1   22.0   145   140.1   37.8   20.4   197.0   52.8   26.2   255.0   68.3   25.2   26.2   28.2   27.2   2   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 15   14.5   3.9   75   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 16   15.5   4.1   76   73.4   19.7   196   131.4   35.2   196   189.3   50.7   256   247.3   266.5   18   17.4   4.7   78   75.9   20.2   198   133.3   35.7   198   191.3   51.2   258   249.3   266.5   191   18.4   4.9   79   76.5   20.4   159   184.3   36.0   199   191.3   51.2   258   249.3   266.8   201   193.5   25.2   267.2   273.2   27                                |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 18   17, 4   4.7   78   75.8   20.2   138   138.3   35.7   198   191.3   51.2   258   249.266.8   19   19.3   5.2   80   77.8   20.7   140   135.2   36.2   200   193.2   51.5   259   250.2   67.0   20   193.3   5.2   80   77.8   20.7   140   135.2   36.2   200   193.2   51.5   259   250.2   67.6   22   21.3   5.7   82   79.2   21.2   142   137.2   36.8   202   195.1   52.5   262   253.1   67.8   23   22.2   6.0   83   80.2   21.5   143   188.1   37.0   203   196.1   52.5   263   264.0   68.3   24   23.2   6.2   84   81.1   21.7   144   139.1   37.5   205   195.0   53.1   265   256.0   68.6   25.1   6.7   86   83.1   22.3   146   141.0   37.8   206   199.0   53.3   266   265.0   68.6   26.2   1 6.7   86   83.1   22.3   146   141.0   37.8   206   299.0   53.8   266   265.9   68.8   27   26.1   7.0   87   84.0   22.5   147   142.0   38.0   2.7   199.9   53.6   267   257.9   69.1   28   270.0   7.8   80.0   23.3   150   144.9   38.6   209   201.9   54.1   269   259.8   69.6   29.2   29.0   7.8   89   86.0   23.3   150   144.9   38.8   210   202.8   54.4   270   260.8   69.9   29.3   39.8   89.8   24.1   153   147.8   39.6   213   205.7   55.1   273   263.7   70.7   275   2                                | 16    |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 19   | 17    |             | 77    |          |         | 137   | 132.3  | 35.5  | 197   | 190.3   | 51.0  | 257   | 248.2    | 66. <b>5</b> |
| 20         19.3         5.2         80         77.3         20.7         140         19.5.2         96.2         200         193.2         51.8         260         251.1         67.3           21         20.3         5.4         81         78.2         21.0         141         136.2         36.8         201         194.2         52.0         261         252.1         67.6           22         21.3         5.7         82         79.2         21.2         141         136.2         36.8         202         195.1         52.3         262         253.1         67.8           24         23.2         6.2         84         81.1         21.7         144         193.1         206         197.0         52.8         262         255.0         68.8         26.2         256.0         68.8         26.2         257.0         68.8         81.2         22.0         144.0         137.5         206         199.0         53.3         266         256.0         68.8           27         26.1         7.0         88.8         85.0         22.8         148         143.0         93.0         29.7         199.9         53.5         266         256.9         68.8 </td <td></td>  |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 21         20.3         5.4         81         78.2         21.0         141         136.2         36.5         201         194.2         52.0         261         252.1         67.6           22         21.3         5.7         82         79.2         21.2         142         137.2         36.8         202         195.1         52.5         263         253.1         67.8           24         23.2         6.0         84         81.121.7         144         139.1         37.3         204         197.0         52.8         264         255.0         68.5           25         24.1         6.5         85         82.1         122.0         145         140.1         37.8         206         199.0         53.1         265         256.0         68.6         83.1         22.3         146         141.0         37.8         206         199.0         53.3         266         256.9         96.8         88.8         22.2         147         142.0         38.0         297         199.9         53.6         267         257.9         69.1           28         27.0         7.2         88         86.0         223.3         150         144.9         38.0 <td></td>   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 22         21.3   5.7           82   79.2   21.2           142   137.2           36.8           202   195.1           52.5           263   225.4           6.0           83   80.2   21.5           143   188.1           37.0           203   196.1           52.5           263   254.0           68.1           21.7           144   139.1           37.0           203   196.1           52.5           263   254.0           68.0           221.7           144   139.1           37.3           204   197.0           52.8   264   255.0           68.3           226.1           7.0           86   83.1   22.3           146   141.0           37.8           206   199.0           53.1   265   256.0           68.6           26.2           52.1           7.0           87   84.0   22.5           147   142.0           38.0           207   199.9           53.3   266   257   257.9           69.1           266   257.9           69.8           88.5   22.8           141.0           37.8           206   199.0           53.3           266   257.9           257.9   69.1           28.2           7.7   7.7           88   85.0   22.8           141   141.0           37.8           209   20.9           53.8           268   258.9           69.4           200.1           141.0           37.2           201.1           201.1           201.1           201.1           201.1           201.1   | 20    | 19.3 5.2    | 80    | 77.3     | U.7     | 140   | 135.2  | 36.2  | 200   | 193.2   | 51.8  | 260   | 251.1    | 07.3         |
| 22         21.3   5.7           82   79.2   21.2           142   137.2           36.8           202   195.1           52.5           263   225.4           6.0           83   80.2   21.5           143   188.1           37.0           203   196.1           52.5           263   254.0           68.1           21.7           144   139.1           37.0           203   196.1           52.5           263   254.0           68.0           221.7           144   139.1           37.3           204   197.0           52.8   264   255.0           68.3           226.1           7.0           86   83.1   22.3           146   141.0           37.8           206   199.0           53.1   265   256.0           68.6           26.2           52.1           7.0           87   84.0   22.5           147   142.0           38.0           207   199.9           53.3   266   257   257.9           69.1           266   257.9           69.8           88.5   22.8           141.0           37.8           206   199.0           53.3           266   257.9           257.9   69.1           28.2           7.7   7.7           88   85.0   22.8           141   141.0           37.8           209   20.9           53.8           268   258.9           69.4           200.1           141.0           37.2           201.1           201.1           201.1           201.1           201.1           201.1   | 21    | 20.3 5.4    | 81    | 78.22    | 1.0     | 141   | 136.2  | 36.5  | 201   | 194.2   | 52.0  | 261   | 252.1    | 67.6         |
| 23         22.2         6.0         83         80.9.2         21.5         143         136.1         37.0         203         196.1         52.5         26.2         32.5         24.1         6.5         85         82.1         22.0         145         140.1         37.5         205         198.0         52.1         26.2         25.0         68.6         83.1         22.3         146         141.0         37.8         206         199.0         53.3         266         256.0         68.6         68.6         28.7         26.1         7.0         87         84.0         22.5         147         142.0         38.0         207         199.9         53.6         267         257.9         69.1           28         27.0         7.2         88         85.0         223.0         149         143.9         38.6         209         201.9         53.6         267         257.9         69.4           29         28.0         7.7         89         86.0         23.0         144         183.0         98.2         201.9         53.6         267         257.9         69.1           31         29.9         8.0         91         87.9         23.8         150.0 <td></td> <td>21.3 5.7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>52.3</td> <td>262</td> <td></td> <td></td>   |       | 21.3 5.7    |       |          |         |       |        |       |       |         | 52.3  | 262   |          |              |
| 25         24.1         6.5         85         82.1         12.0         145         140.1         37.5         205         198.0         53.1         365         256.0         68.8           27         26.1         7.0         87         84.0         22.5         147         142.0         38.0         2.7         199.9         53.3         266         256.9         68.8           29         28.0         7.5         89         86.0         23.0         149         143.9         38.6         209         201.9         53.8         266         258.9,69.4           30         29.0         7.8         90         86.9         23.3         150         144.9         38.8         210         202.8         54.1         270         260.8         69.9           31         29.9         8.0         91         87.9         23.6         151         145.9         39.1         211         203.8         54.6         271         261.8         70.1           32         30.9         8.0         28.3         152         146.8         89.3         212         204.8         54.9         272.2         262.7         70.7           41   |       |             | 83    |          |         | 143   | 138.1  |       | 203   | 196.1   |       | 263   |          |              |
| 26         25.1         6.7         86         83.1   22.3   146         141.0   37.8   206         199.0   53.6   267   257.9   69.1   209.0   201.9   2  | li l  |             | 19    |          |         |       |        |       |       |         |       |       |          |              |
| 27         26.1         7.0         87         84.0         22.5         147         142.0         38.0         2.7         199.9         53.6         267         257.9         69.1           28         27.0         7.2         88         86.0         22.8         148         143.0         98.3         208         200.9         53.8         268         258.9         69.4           30         29.0         7.8         90         86.9         23.3         150         144.9         93.8         210         202.8         54.4         270         260.8         69.9           31         29.9         8.0         91         87.9         23.6         151         145.9         39.1         211         203.8         54.4         270         260.8         86.9         9           31         29.9         8.0         94.1         155         144.9         38.3         212         204.8         54.9         270.2         262.7         70.4           33         31.9         8.5         93.8         89.8         24.1         155         147.7         40.1         215         297.7         55.1         272         266.77.70.4   |       |             | 1     |          |         |       |        |       |       |         |       |       |          |              |
| 28         27.0         7.2         88         85.0         22.8         148         143.0         38.3         208         200.9         53.8         268         258.9         69.4           29         28.0         7.5         89         86.0         23.0         150         144.9         38.8         210         202.8         54.1         260         259.8         69.6           30         29.0         7.8         99         86.9         23.8         150         144.9         38.8         210         202.8         54.4         270         260.8         69.6           31         29.9         8.0         91         87.9         23.6         151         145.9         39.1         201.8         54.6         277         261.8         70.1           33         31.9         8.5         93         89.8         24.1         153         147.8         39.6         213         205.7         55.1         277         262.7         70.7         73.5         53.8         9.8         94.7         25.1         155         149.7         40.1         215.2         207.7         55.6         275.2         266.6         671.4         70.9         93.7  |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 29         28.0         7.5         89         86.0         23.0         149         143.9         38.6         209         201.9         54.1         269         259.8         69.6           30         29.0         7.8         90         86.9         23.3         150         144.9         38.8         210         202.8         54.4         270         260.8         69.9           31         29.9         8.0         91         87.9         23.6         151         145.9         39.1         211         203.8         54.6         271         261.8         70.4           32         30.9         8.5         98         824.1         155         147.8         39.6         213         205.7         755.1         277         262.7         70.4           33         31.9         8.5         99         91.8         24.6         155         147.8         39.6         213         205.7         755.4         274         264.7         70.4           35         33.8         9.1         95         18.24.6         155         149.7         40.1         215         207.7         ,556.6         717.9         266.6         71.4         216  |       |             | 11    |          |         |       |        |       |       | 1       |       |       |          |              |
| 30         29.0         7.8         90         86.9         23.3         150         144.9         38.8         210         302.8         54.4         270         260.8         69.9           31         29.9         8.0         91         87.9         23.6         151         145.9         39.1         211         203.8         54.6         271         261.8         70.1           32         30.9         8.3         92         88.9         23.8         152         146.8         39.3         212         204.8         54.9         272         263.7         70.7           34         32.8         8.8         94         90.8         24.1         155         147.8         39.6         213         205.7         75.5         273         263.7         70.7           35         33.8         9.1         95         91.8         24.6         155         149.7         40.1         215         207.7         .55.6         275         265.6         671.2           36         34.8         9.3         98.7         25.1         157.7         150.6         40.9         218.2         210.6         56.2         277         267.671.7         767.6  |       |             | 11    |          |         |       |        | 1     |       |         |       |       |          |              |
| 31         29.9         8.0         91         87.9         23.6         151         145.9         39.1         211         203.8         54.6         271         261.8         70.1           32         30.9         8.3         92         88.9         23.8         152         146.8         39.3         212         204.8         54.9         272         263.7         70.4           33         31.9         8.5         98         89.8         24.1         153         147.8         39.6         213         205.7         755.1         273         263.7         70.7           34         32.8         8.8         94         90.8         24.3         154         148.8         39.9         214         206.7         55.4         274         264.7         70.9           35         33.8         9.1         95         91.8         24.6         155         149.7         40.1         216         208.6         55.9         276         266.6         71.2           36         34.8         9.3         96         92.7         24.8         156         150.7         40.4         216         208.6         55.9         276         266.671.4  |       |             |       |          |         |       |        | , ,   |       |         |       |       |          |              |
| 32         30.9         8.3         92         88.9         23.8         152         146.8         39.3         212         204.8         54.9         272         263.7         70.7           34         32.8         8.8         94         90.8         24.3         154         148.8         39.9         214         206.7         75.5.4         274         264.7         70.9           35         33.8         9.1         95         91.8         24.6         155         149.7         40.1         215         207.7         7.55.6         275         265.6         71.2           36         34.8         9.3         96         92.7         24.8         156         150.7         40.4         216         208.6         55.9         276         266.6         71.4           37         9.6         97         93.7         25.1         157         151.7         40.6         217         209.6         56.2         277         267.6         71.4           38         36.7         9.8         98         94.7         25.4         158         152.6         40.9         218         210.5         56.4         278         268.5         720.0 <td>-</td> <td></td> <td></td> <td>!</td> <td></td> <td></td> <td></td> <td>!</td> <td></td> <td></td> <td></td> <td>!</td> <td>. </td> <td></td>  | -     |             |       | !        |         |       |        | !     |       |         |       | !     | .        |              |
| 33         \$1.9\$         \$6.5\$         \$93\$         \$8.9.8   24.1   158   147.8   39.6   218   205.7   55.1   273   263.7   70.7   264.7   70.9   265.5   275   265.6   71.2   265.6   265.2   265.6   265.2   265.2   265.6   265.2   265.2   265.2  |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 34         32.8         8.8         94         \$\bar{9}0.8         24.3         154         148.8         39.9         214         206.7         55.4         274         264.7         70.9           35         33.8         9.1         95         91.8         24.6         155         149.7         40.1         215         207.7         ,55.6         275         265.6         71.2           36         34.8         9.3         96         92.7         24.8         156         150.7         40.4         216         208.6         55.9         276         266.6         71.4           37         35.7         9.6         97         93.7         25.4         158         152.6         40.9         218         210.6         56.4         278         267.6         71.7           39         37.7 10.1         99         95.6 25.6         159         153.6         41.2         219         211.5         56.7         279         269.5         72.2           40         38.6, 10.4         100         97.6 26.1         161         155.5         41.7         221         213.5         57.2         281         271.4         72.7           41  |       |             |       |          |         |       |        |       | 1     |         |       |       |          |              |
| 35         33.8         9.1         95         91.8         24.6         155         149.7         40.1         215         207.7         ,55.6         275         265.6         71.2           36         34.8         9.3         96         92.7         24.8         156         150.7         40.4         216         208.6         55.9         276         266.6         71.4           37         35.7         9.6         97         93.7         25.1         157         151.7         40.6         217         209.6         56.2         277         267.6         71.7           38         36.7         9.8         98         94.7         25.4         158         152.6         40.9         218         210.6         56.4         278         268.5         72.2           40         38.6         10.4         100         96.6         25.9         160         154.5         41.4         220         212.5         56.9         280         270.5         72.2           41         39.6         10.6         101         97.6         26.1         161         155.5         41.7         221         213.5         57.2         281         271.4  |       |             |       |          |         |       | 1 :    |       |       | 1       |       | 1     |          |              |
| 36         34.8         9.3         96         92.7 24.8         156         150.7         40.4         216         208.6         55.9         276         266.6         71.4           37         35.7         9.6         97         93.7 25.1         157         151.7         40.6         217         209.6         56.2         277         267.6         71.7           38         36.7         9.8         94.7 25.4         158         152.6         40.9         218         210.6         56.4         278         268.5         72.2           40         38.6 10.4         100         96.6         25.9         160         154.5         41.4         220         212.5         56.9         280         270.5         72.2           41         39.6 10.6         101         97.6 26.1         161         155.5         41.7         221         213.5         57.2         281         271.4         72.7           42         40.6 10.9         102         98.5         26.7         163         157.4         42.2         223         215.4         57.7         283         273.4         73.2           44         25.11.4         104         100.5         26.  |       |             |       |          |         |       |        |       | 1 .   |         |       |       |          |              |
| 38         36.7         9.8         98         94.7         25.4         158         152.6         40.9         218         210.6         56.4         278         268.5         72.0           39         97.7         10.1         99         95.6         25.6         159         153.6         41.2         219         211.5         56.7         279         269.5         72.2           40         38.6         10.4         100         96.6         25.9         160         154.5         41.4         220         212.5         56.9         280         270.5         72.5           41         39.6         10.6         101         97.6         26.1         161         155.5         41.7         221         213.5         57.2         281         271.4         72.7           42         40.6         10.9         98.5         26.4         162         156.5         41.9         222         214.4         57.5         282         273.4         73.0           43         41.5         11.1         104         100.5         26.9         164         158.4         42.7         225         217.3         58.2         285         275.3         73.8  | 36    | 34.8 9.3    | 96    |          |         |       |        |       |       | 208.6   | 55.9  | 276   | 266.6    | 71.4         |
| 89         37.7   10.1         99         95.6   25.6   159         153.6   41.2   219   211.5   56.7   279   269.5   72.2   240.6   10.0   96.6   25.9   160   154.5   41.4   220   212.5   56.9   280   270.5   72.5   241   240.6   10.9   102   98.5   26.4   162   156.5   41.7   221   213.5   57.2   281   271.4   72.7   72.4   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.7   72.4   72.4   72.7   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 40         38.6   10.4         100         96.6   25.9           160         154.5           41.4           220         212.5           56.9           280           270.5           72.5             41         39.6   10.6           101           97.6   26.1           161           155.5           41.7           221           213.5           57.2           281           271.4           72.7             42         40.6   10.9           102           98.5           26.4           162           156.5           41.9           292           214.4           57.5           282           272.4           73.0             43         41.5   11.1           103           99.5           26.7           163           157.4           42.2           223           215.4           57.7           283           273.4           73.2             44         42.5           11.4           104           100.5           26.9           164           158.4           42.4           224           216.4           57.0           284           274.3           73.2             45         48.5           11.6           105           101.4           27.7           167           66.3           33.0           226           218.3           58.   |       |             |       |          |         |       |        |       | 1     |         |       |       |          |              |
| 41         \$9.6   0.6   0.6   101   97.6   26.1   161   155.5   41.7   221   213.5   57.2   281   271.4   72.7   42   40.6   10.9   102   98.5   26.4   162   156.5   41.9   222   214.4   57.5   282   272.4   73.0   43   41.5   11.1   103   99.5   26.7   163   157.4   42.2   223   215.4   57.7   283   273.4   73.2   44   42.5   11.4   104   100.5   26.9   164   158.4   42.4   224   216.4   58.0   284   274.3   73.5   45   43.5   11.6   105   101.4   27.2   165   159.4   42.7   225   217.3   58.2   285   275.3   73.8   46   44.4   11.9   106   102.4   27.4   166   160.3   43.0   226   218.3   58.5   286   276.3   74.0   47   45.4   12.2   107   103.4   27.7   167   161.3   43.2   227   219.3   58.8   287   277.2   74.3   48   46.4   12.4   108   104.3   28.0   168   162.3   43.5   228   220.2   59.0   288   278.2   74.5   49.47.3   12.7   109   105.3   28.2   169   163.2   43.7   229   221.2   59.3   289   279.2   74.5   48.3   12.9   110   106.3   28.5   170   164.2   44.0   230   222.2   59.5   290   280.1   75.1   51   49.3   13.2   111   107.2   28.7   171   165.2   44.3   231   223.1   59.8   291   281.1   75.3   52.2   14.0   114   110.1   29.5   174   168.1   45.0   234   226.0   60.6   294   284.0   76.1   55   55.1   14.8   117   113.0   30.3   177   171.0   45.8   237   228.0   61.3   297   286.9   76.6   57   55.1   14.8   117   113.0   30.3   177   171.0   45.8   237   228.0   61.3   297   286.9   76.9   57.0   15.3   119   114.9   30.8   179   172.9   46.3   239   230.9   61.6   298   287.8   77.4   60   58.0   15.5   120   115.9   31.1   180   173.9   46.6   240   231.8   62.1   300   289.8   77.4   60   58.0   15.5   120   115.9   31.1   180   173.9   46.6   240   231.8   62.1   300   289.8   77.6   60   58.0   15.5   120   115.9   31.1   180   173.9   46.6   240   231.8   62.1   300   289.8   77.6   240   240   240   231.8   62.1   300   289.8   77.6   240   240   240   231.8   62.1   300   289.8   77.6   240   240   240   231.8   62.1   300   289.8   77.6   240   2                                |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 42       40.6   10.9   102   98.5   26.4   162   156.5   41.9   292   214.4   57.5   282   272.4   78.0           43       41.5   11.1   103   99.5   26.7   163   157.4   42.2   223   215.4   57.7   283   273.4   73.2           44       42.5   11.4   104   100.5   26.9   164   158.4   42.4   224   216.4   58.0   284   274.3   73.5           45       43.5   11.6   105   101.4   27.2   165   159.4   42.7   225   217.3   58.2   285   275.3   73.8           46       44.4   11.9   106   102.4   27.4   166   160.3   43.0   226   218.3   58.5   286   276.3   74.0           47       45.4   12.2   107   103.4   27.7   167   161.3   43.2   227   219.3   58.8   287   277.2   74.3           48       46.4   12.4   108   104.3   28.0   168   162.3   43.5   228   220.2   59.3   288   278.2   274.5           49       47.3   12.7   109   105.3   28.2   169   163.2   43.7   229   221.2   59.3   289   279.2   74.8           50       48.3   12.9   110   106.3   28.5   170   164.2   44.0   230   222.2   59.5   290   280.1   75.1           51       49.3   13.2   111   107.2   28.7   171   165.2   44.3   231   223.1   59.8   291   281.1   75.3           52       50.2   13.5   112   108.2   29.0   172   166.1   44.5   232   224.1   60.0   292   282.1   75.6           53       51.2   13.7   113   109.1   29.2   173   167.1   44.8   233   225.1   60.3   293   283.0   75.8           54       52.2   14.0   114   110.1   29.5   174   168.1   45.0   234   226.0   60.6   294   284.0   76.1           55       53.1   14.2   115   111.1   29.8   175   169.0  | 40    | 38.6,10.4   | 100   | 96.62    | 3.9     | 160   | 154.5  | 41.4  | 220   | 212.5   | 56.9  | 280   | 270.5    | 12.5         |
| 43       41.5   11.1   103   99.5   26.7   163   157.4   42.2   223   215.4   57.7   283   273.4   73.2   244   42.5   11.4   104   100.5   26.9   164   158.4   42.4   224   216.4   58.0   284   274.8   73.5   45.5   11.6   105   101.4   27.2   165   159.4   42.7   225   217.3   58.2   285   275.3   73.8   46   44.4   11.9   106   102.4   27.4   166   160.3   43.0   226   218.3   58.5   286   276.3   74.0   47.4   45.4   12.2   107   103.4   27.7   167   161.3   43.2   227   219.3   58.8   287   277.2   74.3   48   46.4   12.4   108   104.3   28.0   168   162.3   43.5   228   220.2   59.0   288   278.2   74.5   49   47.3   12.7   109   105.3   28.2   169   163.2   43.7   229   221.2   59.3   289   279.2   274.8   50   48.3   12.9   110   106.3   28.5   170   164.2   44.0   230   222.2   59.5   290   280.1   75.1   51   49.3   13.2   111   107.2   28.7   171   165.2   44.3   231   223.1   59.8   291   281.1   75.3   285   25.3  |       |             | 101   |          |         | 161   | 155.5  | 41.7  | 221   |         |       |       |          |              |
| 44       42.511.4       104       100.526.9       164       158.4       42.4       224       216.4       58.0       284       274.3       73.5         45       43.511.6       105       101.427.2       165       159.4       42.7       225       217.3       58.2       285       275.3       73.8         46       44.411.9       106       102.427.4       166       160.3       43.0       226       218.3       58.5       286       276.3       74.0         47       45.412.2       107       103.427.7       167       161.3       43.2       297       219.3       58.8       287       277.274.0         49       47.312.7       109       105.328.2       169       163.2       43.7       229       221.2       59.0       288       278.2       74.5         49       47.312.7       109       105.328.5       170       164.2       44.0       230       222.2       59.0       288       277.274.3         50       48.312.9       110       106.328.5       170       164.2       44.0       230       222.2       59.5       290       280.175.1         51       49.313.2       111       107.228  |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 45       43.5   11.6   105   101.4   27.2   165   159.4   42.7   225   217.3   58.2   285   275.3   73.8   46   44.4   11.9   106   102.4   27.4   166   160.3   43.0   226   218.3   58.5   286   276.3   74.0   47   45.4   12.2   107   103.4   27.7   167   161.3   43.2   297   219.3   58.8   287   277.2   74.3   48   46.4   12.4   108   104.3   28.0   168   162.3   43.5   228   220.2   59.0   288   278.2   74.5   49   47.3   12.7   109   105.3   28.2   169   163.2   43.7   229   221.2   59.3   289   279.2   74.8   50   48.3   12.9   110   106.3   28.5   170   164.2   44.0   230   222.2   59.5   290   280.1   75.1   11   107.2   28.7   171   165.2   44.3   231   223.1   59.8   291   281.1   75.3   52   50.2   13.5   112   108.2   29.0   172   166.1   44.5   232   224.1   60.0   292   282.1   75.6   53   51.2   13.7   113   109.1   29.2   173   167.1   44.8   233   225.1   60.3   293   283.0   75.8   54   52.2   14.0   114   110.1   29.5   174   168.1   45.0   234   226.0   60.6   294   284.0   76.1   55   53.1   14.2   115   111.1   29.8   175   169.0   45.3   235   227.0   60.8   295   284.9   76.4   56   54.1   14.5   116   112.0   30.0   176   170.0   45.6   236   238.0   61.1   296   285.9   76.6   55   55.1   14.8   117   113.0   30.3   177   171.0   45.8   237   228.9   61.6   298   287.8   77.1   59   57.0   15.3   119   114.9   30.8   179   172.9   46.3   239   230.9   61.9   299   288.8   77.4   60   58.0   15.5   120   115.9   31.1   180   173.9   46.6   240   231.8   62.1   300   289.8   77.6   177.6   240   240   231.8   62.1   300   289.8   77.6   240   240   231.8   62.1   300   289.8   77.6   240   240   231.8   62.1   300   289.8   77.6   240   240   231.8   62.1   300   289.8   77.6   240   240   231.8   62.1   300   289.8   77.6   240   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   240   231.8   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 46       44.4   11.9   106   102.4   27.4   166   160.3   43.0   226   218.3   58.5   286   276.3   74.0         47   45.4   12.2   107   103.4   27.7   167   161.3   43.2   227   219.3   58.8   287   277.2   74.3         48   46.4   12.4   108   104.3   28.0   168   162.3   43.5   228   220.2   229.2   259.5   288   278.2   74.5         49   47.3   12.7   109   105.3   28.2   169   163.2   43.7   229   221.2   59.3   289   279.2   74.8         50   48.3   12.9   110   106.3   28.5   170   164.2   44.0   230   222.2   59.5   290   280.1   75.1           51       49.3   13.2   111   107.2   28.7   171   165.2   44.3   231   223.1   59.8   291   281.1   75.3           52       50.2   13.5   112   108.2   29.0   172   166.1   44.5   232   224.1   60.0   292   282.1   75.6           53       51.2   13.7   118   109.1   29.2   173   167.1   44.8   253   225.1   60.3   293   283.0   75.8           54       52.2   14.0   114   110.1   29.5   174   168.1   45.0   234   226.0   60.6   294   284.0   76.1           55       53.1   14.2   115   111.1   29.8   175   169.0   45.3   235   227.0   60.8   295   284.9   76.4           56       54.1   14.5   116   112.0   30.0   176   170.0   45.6   236   228.0   61.1   296   285.9   76.6           57       55.1   14.8   117   113.0   30.3   177   171.0   45.8   237   228.9   61.6   298   287.8   77.1           59       57.0   15.3   119   114.9   30.8   179   172.9   46.3   239   230.9   61.9   299   288.8   77.4           60       58.0   15.5   120   115.9   31.1   180   173.9   46.6   240   231.8   62.1   300   289.8   77.6   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 47       45.4   12.2   107   103.4   27.7   167   161.3   43.2   227   219.3   58.8   287   277.2   74.3   48   46.4   12.4   108   104.3   28.0   168   162.3   43.5   228   220.2   59.0   288   278.2   74.5   49   47.3   12.7   109   105.3   28.2   169   163.2   43.7   229   221.2   59.3   289   279.2   74.8   50   48.3   12.9   110   106.3   28.5   170   164.2   44.0   230   222.2   59.5   290   280.1   75.1   75.3   75.2   75.3   7   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 48       46.412.4       108       104.3 28.0       168       162.3       43.5       228       220.2       59.0       288       278.2       74.5         49       47.3 12.7       109       105.3 28.2       169       163.2       43.7       229       221.2       59.3       289       279.2       274.8         50       48.3 12.9       110       106.3 28.5       170       164.2       44.0       230       222.2       59.5       290       280.1       75.1         51       49.3 13.2       111       107.2 28.7       171       165.2       44.3       231       223.1       59.8       291       281.1 75.3         52       50.2 13.5       112       108.2 29.0       172       166.1 44.5       232       224.1 60.0       292       282.1 75.6         53       51.2 13.7       113       109.1 29.2       173       167.1 44.8       233       225.1 60.0       292       283.0 75.6         54       52.2 14.0       114       110.1 29.5       174       168.1 45.0       234       226.0       60.6       294       284.0 76.1         55       53.1 14.2       115       111.1 129.8       175       169.0       45.3   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 49         47.3         12.7         109         105.3         28.2         169         163.2         43.7         229         221.2         59.3         289         279.2         74.8           50         48.3         12.9         110         106.3         28.5         170         164.2         44.0         230         222.2         59.5         290         280.1         75.1           51         49.3         13.2         111         107.2         28.7         171         165.2         44.3         231         223.1         59.8         291         281.1         75.3           52         50.2         13.5         112         108.2         29.0         172         166.1         44.5         232         224.1         60.0         292         282.1         75.6           53         51.2         13.7         113         109.1         29.2         173         167.1         44.8         233         225.1         60.3         293         283.0         75.8           54         52.2         14.0         114         110.1         129.8         175         169.0         45.3         235         227.0         60.8         295         284.   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 50         48.3   12.9           110         106.3   28.5           170         164.2   44.0           230   222.2           25.5           290   280.1   75.1             51         49.3   13.2           111   107.2   28.7           171   165.2   44.3           231   223.1   59.8           291   281.1   75.3             52         50.2   13.5           112   108.2   29.0           172   166.1   44.5           232   224.1           60.0   292   282.1   75.6             53         51.2   13.7           118   109.1   29.2           173   167.1   44.8           233   225.1           60.3   293   283.0   75.8             54         52.2   14.0           114   110.1   129.5           174   168.1   45.0   234   226.0   60.6   69.4   294   284.0   76.1           55.5   53.1   14.2   115   111.1   29.8   175   169.0   45.3   235   227.0   60.8   295   284.9   76.4             56         54.1   14.5   116   112.0   30.0   176   170.0   45.6   236   228.0   61.1   296   285.9   76.6           57   55.1   14.8   117   113.0   30.3   177   171.0   45.8   237   228.9   61.3   297   286.9   76.9             58         56.0   15.0   118   114.0   30.5   178   171.9   46.1   238   239.9   290.9   61.6   298   287.8   77.1             59         57.0   15.3   119   114.9   30.8   179   172.9   46.3   239   230.9   61.9   299   288.8   77.4             60         58.0   15.5   120   115.9   31.1   180   173.9   46.6   240   231.8   62.1   300   289.8   77.6   |       |             | 4     |          |         |       |        |       | 1     |         |       |       |          |              |
| 52         50.2   13.5           112   108.2   29.0           172   166.1           44.5   232   224.1           60.0   292   282.1           75.6             53         51.2   13.7           113   109.1   29.2           173   167.1           44.8   253   225.1           60.3   293   283.0           75.8             54         52.2   14.0           114   110.1   29.5           174   168.1   45.0   234   226.0           60.6   294   284.0           76.1             55         53.1   14.2   115   111.1   29.8   175   169.0   45.3   235   227.0           60.8   295   284.9           76.4             56         54.1   14.5   116   112.0   30.0   176   170.0   45.6   236   228.0   61.1   296   285.9           285.9   76.6             57         55.1   14.8   117   113.0   30.3   177   171.0   45.8   237   228.9   61.3   297   286.9   76.9             58         56.0   15.0   118   114.0   30.5   178   171.9   46.1   238   229.9   61.6   298   287.8   77.1             59         57.0   15.3   119   114.9   30.8   179   172.9   46.3   239   230.9   61.9   299   288.8   77.4             60         58.0   15.5   120   115.9   31.1   180   173.9   46.6   240   231.8   62.1   300   289.8   877.6  | 50    |             |       | 106.3    | 8.5     |       |        |       |       | 222.2   |       | 290   | 280.1    | 75.1         |
| 52         50.2   13.5           112   108.2   29.0           172   166.1           44.5   232   224.1           60.0   292   282.1           75.6             53         51.2   13.7           113   109.1   29.2           173   167.1           44.8   253   225.1           60.3   293   283.0           75.8             54         52.2   14.0           114   110.1   29.5           174   168.1   45.0   234   226.0           60.6   294   284.0           76.1             55         53.1   14.2   115   111.1   29.8   175   169.0   45.3   235   227.0           60.8   295   284.9           76.4             56         54.1   14.5   116   112.0   30.0   176   170.0   45.6   236   228.0   61.1   296   285.9           285.9   76.6             57         55.1   14.8   117   113.0   30.3   177   171.0   45.8   237   228.9   61.3   297   286.9   76.9             58         56.0   15.0   118   114.0   30.5   178   171.9   46.1   238   229.9   61.6   298   287.8   77.1             59         57.0   15.3   119   114.9   30.8   179   172.9   46.3   239   230.9   61.9   299   288.8   77.4             60         58.0   15.5   120   115.9   31.1   180   173.9   46.6   240   231.8   62.1   300   289.8   877.6  | 51    | 49 3 13 9   | 111   | 107 99   | 8.7     | 171   | 165 9  | 44 0  | 231   | 223 1   | 59.8  | 201   | 281.1    | 75.3         |
| 53         51.2         13.7         113         109.1         29.2         173         167.1         44.8         233         225.1         60.3         293         283.0         75.8           54         52.2         14.0         114         110.1         29.5         174         168.1         45.0         234         226.0         60.6         294         284.0         76.1           55         53.1         14.2         115         111.1         129.8         175         169.0         45.3         295         227.0         60.8         295         284.9         76.4           56         54.1         14.5         116         112.0         30.0         176         170.0         45.6         236         228.0         61.1         296         285.9         76.6           57         55.1         14.8         117         113.0         30.3         177         171.0         45.8         237         228.9         61.3         297         286.9         976.9           58         56.0         15.0         118         114.9         30.8         179         172.9         46.3         239         230.9         61.6         298         287   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 54         52,2   14.0         114         110.1   29.5         174         168.1   45.0   234         226.0   60.6   294         284.0   76.1   285.5   285.5   287.0   60.8   295.5   284.9   76.4   285.5   285.5   287.0   60.8   295.5   284.9   76.4   285.5   285   | 53    | 51.2 13.7   |       |          |         |       |        |       | 233   |         |       | ,     |          |              |
| 55     53.1   14.2   115   111.1   129.8   175   169.0   45.3   235   227.0   60.8   295   284.9   76.4         56     54.1   14.5   116   112.0   30.0   176   170.0   45.6   236   228.0   61.1   296   285.9   76.6         57     55.1   14.8   117   113.0   30.3   177   171.0   45.8   237   228.0   61.3   227   286.9   76.9         58     56.0   15.0   118   114.0   30.5   178   171.9   46.1   238   229.9   61.6   298   287.8   77.1         59     57.0   15.3   119   114.9   30.8   179   172.9   46.3   239   230.9   61.9   299   288.8   77.4         60     58.0   15.5   120   115.9   31.1   180   173.9   46.6   240   231.8   62.1   300   289.8   77.6   | 54    |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 57     55.1     14.8     117     113.0     30.3     177     171.0     45.8     237 • 228.9     61.3     297     286.9     76.9       58     56.0     15.0     118     114.0     30.5     178     171.9     46.1     238     229.9     61.6     298     287.8     77.1       59     57.0     15.3     119     114.9     30.8     179     172.9     46.3     239     290.9     61.9     299     288.8     77.4       60     58.0     15.5     120     115.9     31.1     180     173.9     46.6     240     231.8     62.1     300     289.8     77.6  |       | 53.1 14.2   | 115   | 111.129  | 9.8     | 175   | 169.0  | 45.3  | 235   | 227.0   | 60.8  | 295   |          |              |
| 58     56.0   15.0       118   114.0   30.5       178   171.9   46.1       238   229.9   61.6       298   287.8   77.1         59   57.0   15.3       119   114.9   30.8       179   172.9   46.3       239   230.9   61.9       299   288.8   77.4         60   58.0   15.5       120   115.9   31.1       180   173.9   46.6       240   231.8   62.1       300   289.8   77.6   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 59 57.0 15.3 119 114.9 30.8 179 172.9 46.3 239 230.9 61.9 299 288.8 77.4 60 58.0 15.5 120 115.9 31.1 180 173.9 46.6 240 231.8 62.1 300 289.8 77.6  |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| 60   58.0   15.5   120   115.9   31.1   180   173.9   46.6   240   231.8   62.1   300   289.8   77.6   |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
|  |       |             |       |          |         |       |        |       |       |         |       |       |          |              |
| Dist. Dep. D. Lat  | l     | '           |       |          |         |       | '      |       |       |         |       |       | <u> </u> |              |
|  | Dist. | Dep. D. Lat | Dist. | Dep. D   | Jat   ] | Dist. | Dep.   | D.Lat | Dist. | Dep.    | D.Lat | Dist. | Dep.     | U.J.at       |

75 Degrees.

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

|                 |               |            |          |                |              | 16         | Degre            | es.          |            | <del>-</del>             |            |                        | -1         |
|-----------------|---------------|------------|----------|----------------|--------------|------------|------------------|--------------|------------|--------------------------|------------|------------------------|------------|
| )ist.           | D.Lat         | Dep.       | Dist.    | D.Lat          | Dep.         | Dist.      | D.Lat            | Dep.         | Dist.      | D.Lat Dep.               | Dist.      | DLat De                | ep.        |
| 1               | 1.0           | 0.3        | 61       | 58.6           | 16.8         | 121        | 116.3            | 33.4         | 181        | 174.0 49.9               | 241        | 231.7,66.              | 4          |
| 2               | 1.9<br>2.9    | 0.6        | 62       | 59.6           | 17.1         | 122        | 117.9            | 33.6         | 182        | 174.950.2                | 242        | 232.666.               |            |
| 4               | 3.8           | 0.8        | 63<br>64 | 60.6           | 17.4<br>17.6 | 123<br>124 | $118.2 \\ 119.2$ | 33.9<br>34.2 | 183        | 175.950.4                | 243        | 233.667.               |            |
| 5               | 4.8           | 1.4        | 65       | 62.5           | 17.9         | 125        | 120.2            | 34.5         | 184<br>185 | 176.950.7<br>177.851.0   | 244<br>245 | 234.5 67.<br>235.5 67. |            |
| 6               | 5.8           | 1.7        | 66       | 63.4           | 18.2         | 126        | 121.1            | 34.7         | 186        | 178.8 51.3               | 246        | 236.567                |            |
| 7               | 6.7           | 1.9        | 67       | 64.4           | 18.5         | 127        | 122.1            | 35.0         | 187        | 179.8 51.5               | 247        | 237.4 68               | .1         |
| 9               | 7.7<br>8.7    | 2.2        | 68<br>69 | 65.4           | 18.7<br>19.0 | 128<br>129 | 123.0            | 35.8         | 188        | 180.7 51.8               | 248        | 238.468                |            |
| 10              | 9.6           | 2.8        | 70       | 67.3           | 19.3         | 130        | 124.0<br>125.0   | 35.6<br>35.8 | 189<br>190 | 181.7 52.1<br>182.6 52.4 | 249<br>250 | 239.468<br>240.368     |            |
| 11              | 10.6          | 3.0        | 71       | 68.2           | 19.6         | 131        | 125.9            |              |            |                          |            |                        | }`         |
| 12              | 11.5          | 3.3        | 72       | 69.2           | 19.8         | 132        | 126.9            |              | 191<br>192 | 183.6 52.6<br>184.6 52.9 | 251<br>252 | 241.369<br>242.269     |            |
| 13              | 12.5          | 3.6        | 73       | 70.2           | 20.1         | 133        | 127.8            | 36.7         | 193        | 185.553.2                | 253        | 243.269                |            |
| 14              | 13.5          | 3 9        | 74       | 71.1           | 20.4         | 134        | 128.8            | 36.9         | 194        | 186.5 53.5               | 254        | 244.270                |            |
| 15<br>16        | 14.4          | 4.1        | 75<br>76 | 72.1<br>73.1   | 20.7         | 135<br>136 | 129.8<br>130.7   | 37.2<br>37.5 | 195        | 187.453.7                | 255        | 245.170                |            |
| 17              | 16.3          | 4.7        | 77       | 74.0           | 21.2         | 137        | 131.7            | 37.8         | 196<br>197 | 188.454.0<br>189.454.3   | 256<br>257 | 246.170<br>247.070     |            |
| 18              | 17.3          | 5.0        | 78       | 75.0           | 21.5         | 138        | 132.7            |              | 198        | 190.354.6                | 258        | 248.071                |            |
| 19              | 18.9          | 5.2        | 79       | 75.9           | 21.8         | 139        | 133.6            |              | 199        | 191.354.9                | 259        | 249.071                |            |
| 20              | 19.2          | 5.5        | 80       | 76.9           | 22.1         | 140        | 134.6            | 38.6         | 200        | 192.3 55.1               | 260        | 249.971                | -7         |
| 21<br>22        | 20.2<br>21.1  | 5.8<br>6.1 | 81<br>82 | 77.9           | 22.3<br>22.6 | 141        | 135.5            |              | 201        | 193.2 55.4               | 261        | 250.971                |            |
| 23              | 22.1          | 6.3        | 83       | 79.8           | 22.9         | 142<br>143 | 136.5<br>137.5   |              | 202<br>203 | 194.2 55.7<br>195.1 56.0 | 262<br>263 | 251.972<br>252.872     |            |
| 24              | 23.1          | 6.6        | 84       | 80.7           | 23.2         | 144        | 138.4            |              | 204        | 196.1 56.2               | 264        | 258.872                |            |
| 25              | 24.0          | 6.9        | 85       | 81.7           | 23.4         | 145        | 139.4            | 40.0         | 205        | 197.1 56.5               | 265        | 254.7 75               | 3.0        |
| 26<br>27        | 25.0          | 7.2        | 86<br>87 | 82.7<br>83.6   | 23.7         | 146        | 140.3            | 40.2         | 206        | 198.0 56.8               | 266        | 255.7 79               |            |
| 28              | 26.0<br>26.9  | 7.7        | 88       | 84.6           | 24.0<br>24.3 | 147<br>148 | 141.3<br>142.3   | 40.5<br>40.8 | 207<br>208 | 199.057.1<br>199.957.3   | 267<br>268 | 256.775<br>257.675     |            |
| 29              | 27.9          | 8.0        | 89       | 85.6           |              | 149        | 143.2            | 41.1         | 209        | 200.957.6                | 269        | 258.674                |            |
| 30              | 28.8          | 8.3        | 90       | 86.5           | 24.8         | 150        | 144.2            | 41.3         | 210        | 201.9 57.9               | 270        | 259.5                  |            |
| 31              | 29.8          | 8.5        | 91       | 87.5           | 25.1         | 151        | 145.2            | 41.6         | 211        | 202.8 58.2               | 271        | 260.5                  | 4.7        |
| <b>32</b><br>33 | 30.8          | 8.8<br>9.1 | 92<br>93 | 88.4           | 25.4         | 152        | 146.1            | 41.9         | 212        | 203.8 58.4               | 272        | 261.57.                | 5.0        |
| 34              | 31.7<br>32.7  | 9.1        | 93       | 89.4<br>90.4   | 25.6<br>25.9 | 153<br>154 | 147.1<br>148.0   | 42.4         | 213<br>214 | 204.7 58.7<br>205.7 59.0 | 273        | 262.4 7.<br>263.4 7.   |            |
| 35              | 33.6          | 9.6        | 95       | 91.5           |              | 155        | 149.0            | 42.7         | 215        | 206.7 59.3               | 275        | 264.37                 |            |
| 36              | 34.6          |            | 96       | 92.3           |              | 156        | 150.0            | 43.0         | 216        | 207.6 59.5               | 276        | 265.37                 |            |
| 37<br>38        | 35.6<br>\$6.5 |            | 97       | 93.2<br>94.2   | 26.7         | 157        | 150.9            | 45.3         | 217        | 208.6 59.8               | 277        | 266.37                 |            |
| 39              | 37.5          |            | 99       | 95.2           | 27.0<br>27.3 | 158<br>159 | 151.9 $152.8$    | 43.6<br>43.8 | 218<br>219 | 209.660.1<br>210.560.4   | 278<br>279 | 267.27<br>268.27       |            |
| 40              | 38.5          |            | 100      | 96.1           | 27.6         | 160        | 153.8            | 44.1         | 220        | 211.5 60.6               |            | 269.27                 |            |
| 41              | 39.4          | 11.8       | 101      | 97.1           | 27.8         | 161        | 154.8            | 44.4         | 221        | 212.460.9                | 281        | 270.17                 | 7.5        |
| 42              | 40.4          |            | 102      | 98.0           | 28.1         | 162        | 155.7            | 44.7         | 222        | 213.461.2                |            | 271.17                 |            |
| 43              | 41.3<br>42.3  |            | 103      | 99.0           |              | 163        | 156.7            | 44.9         | 223        | 214.461.5                | 283        | 272.07                 |            |
| 45              | 43.3          |            | 104      | 100.0          | 28.7<br>28.9 | 164<br>165 | 157.6<br>158.6   | 45.2<br>45.5 | 224<br>225 | 215.361.7<br>216.362.0   | 284<br>285 | 273.0,7<br>274.0,7     |            |
| 46              | 44.2          |            | 106      | 101.9          | 29.2         | 166        | 159.6            | 45.8         |            | 217.262.3                | 286        | 274.9.7                |            |
| 47              | 45.2          |            | 107      | 102.9          |              | 167        | 160.5            | 46.0         | 227        | 218.262.6                | 287        | 275.97                 | 9.1        |
| 48<br>49        | 46.1<br>47.1  |            | 108      | 103.8<br>104.8 | 29.8<br>30.0 | 168        | 161.5            | 46 3         | 228        | 219.262.8                | 288        | 276.8 7                | 9.4        |
| 50              | 48.1          |            | 3        | 105.7          | 30.0         | 169<br>170 | 162.5<br>163.4   | 46.6<br>46.9 | 229<br>230 | 220.163.1<br>221.163.4   | 289<br>290 | 277.8 7<br>278.8 7     |            |
| 51              | 49.0          | 14.1       | 111      | 106.7          | 30.6         | 171        | 164.4            |              | 231        | 222.163.7                |            | 279.78                 |            |
| 12              | 50:0          | 14.3       | 112      | 107.7          | 30.9         |            | 165.3            |              |            | 223.063.9                |            | 280.78                 | 0.5        |
| 13              | 50.9          |            |          | 108.6          |              | 173        | 166.3            | 47.7         | 233        | 224.064.2                | 293        | 281.68                 | 0.8        |
| <b>14</b><br>15 | 51.9<br>52.9  |            | 114      | 109.6<br>110.5 | 31.4         | 174        | 167.3            | 48.0         | 234        | 224.964.5                |            | 282.68                 | 1.0        |
| 16              | 53.8          |            |          | 111.5          | 32.0         | 175<br>176 | 168.2<br>169.2   | 48.2<br>48.5 | 235<br>236 | 225.964.8<br>226.965.1   | 295<br>296 | 283.68<br>284.58       | 1.6        |
| 17              | 54.8          | 15.7       | 117      | 112.5          | \$3.2        | 177        | 170.1            | 48.8         | 237        | 227.865.3                | 297        | 285.58                 |            |
| 18              | 55.8          |            |          | 113.4          | 32.5         | 178        | 171.1            | 49.1         | 238        | 228.8 65.6               | 298        | 286.58                 | 2.1        |
| 10<br>10        | 56.7<br>57.7  |            | 119      | 114.4          |              | 179<br>180 | 172.1<br>173.0   | 49.3<br>49.6 | 239<br>240 | 229.765.9<br>230.766.2   | 299<br>300 | 287.489<br>288.489     | z.4<br>2.7 |
| Бŧ.             | Dep.          |            | -        |                |              |            |                  |              |            | I                        |            | <u>'</u>               |            |
| <b>PP4</b> .    | reb.          | n.nat      | 1/181.   | Dep.           | D. Lat       |            |                  | D.Lat        | Dist.      | Dep Diat                 | Dist.      | Dep. D                 | 1.1.00     |
| 1.6             | <u> </u>      |            |          |                |              | - /4       | Degre            |              |            |                          |            |                        |            |

|          |              |            |            |                          |            | 7 Deg            |              |            |                |              |            |                |              |
|----------|--------------|------------|------------|--------------------------|------------|------------------|--------------|------------|----------------|--------------|------------|----------------|--------------|
| Dist.    | DLat         | Dep.       | Dist.      | D.Lat Dep.               | Dist.      | D.Lat            | Dep.         | Dist.      | DLat           | Dep.         | Dist.      | D.Lat          | Dep.         |
| 1        | 1.0          | 0.3        | 61         | 58.3 17.8                | 121        | 115.7            | 35.4         | 181        | 173.1          | 52.5         | 241        | 230.5          | 70.5         |
| 2        | 1.9          | 0.6        | 62         | 59.3 18.1                |            | 116.7            | 35.7         | 182        | 174.0          | 53.2         | 242        | 231.4          | 70.8         |
| 3        | 2.9          | 0.9        | 63         | 60.2 18.4                |            | 117.6            | 36.0         |            | 175.0          | 53.5         |            | 232.4          | 71.0         |
| 4        | 3.8          | 1.2        | 64         | 61.2 18.7                |            | 118.6            | 36.3         | 184        | 176.0          | 53.8         | 244        | 233.3          | 71.3         |
| 5<br>6   | 4.8<br>5.7   | 1.5        | 65<br>66   | 62.2 19.0<br>63.1 19.3   | 125<br>126 | 119.5 $120.5$    | 36.5         | 185        | 176.9<br>177.9 | 54.1<br>54.4 | 245        | 234.3          | 71.6         |
| 7        | 6.7          | 2.0        | 67         | 64.1 19.6                |            | 121.5            | 36.8<br>37.1 | 186<br>187 | 178.8          | 54.7         | 246        | 235.3<br>236.9 | 71.9<br>72.2 |
| 8        | 7.7          | 2.3        | 68         | 65.0 19.9                |            | 122.4            | 37.4         | 188        | 179.8          | 55.0         | 248        | 237.2          | 72.5         |
| 9        | 8.6          | 2.6        | 69         | 66.0 20.2                | 129        | 123.4            | 37.7         | 189        | 180.7          | <b>5</b> 5.€ | 249        | 238.1          | 72.8         |
| 10       | 9.6          | 2.9        | 70         | 66.9 20.5                | 130        | 124.3            | 38.0         | 190        | 181.7          | <b>5</b> 5.6 | 250        | 239.1          | 73.1         |
| 11       | 10.5         | 3.2        | 71         | 67.9 20.8                | 131        | 125.3            | 38.3         | 191        | 182.7          | 55.8         | 251        | 240.0          | 73.4         |
| 12       | 11.5         | 3.5        | 72         | 68.9 21.1                | 132        | 126.2            | 38.6         | 192        | 183.6          | 56.1         |            | 241.0          | 73.7         |
| 13       | 12.4         | 3.8        | 73         | 69.8 21.3                | 133        | 127.2            | 38.9         | 193        | 184.6          | 56.4         | 253        | 241.9          | 74.0         |
| 14       | 13.4         | 4.1        | 74         | 70.8 21.6                |            | 128.1            | 39.2         |            | 185.5          | 56.7         |            | 242.9          | 74.3         |
| 15       | 14.3         | 4.4        | 75         | 71.721.9                 | 135        | 129.1            | 39.5         | 195        | 186.5          | 57.0         |            | 248.9          | 74.6         |
| 16<br>17 | 15.3<br>16.3 | 4.7<br>5.0 | 76<br>77   | 72.7 22.2<br>73.6 22.5   |            | 130.1<br>131.0   | 39.8         | 196        | 187.4<br>188.4 | 57.5<br>57.6 | 256        | 244.8          | 74.8         |
| 18       | 17.2         | 5.3        | 78         | 74.6 22.8                |            | 132.0            | 40.1         | 197        | 189.3          | 57.9         | 257<br>258 | 245.8<br>246.7 | 75.1<br>75.4 |
| 19       | 18.2         | 5.6        | 79         | 75.5 23.1                | 139        | 132.9            | 40.6         | 199        | 190.5          | 58.2         | 259        | 247.7          | 75.7         |
| 20       | 19.1         | 5.8        | 80         | 76.5 23.4                |            | 133.9            | 40.9         | 200        | 191.3          | 58.5         | 260        | 248.6          | 76.0         |
| 21       | 20.1         | 6.1        | 81         | 77.5 23.7                | 141        | 134.8            | 41.2         | 201        | 192.2          | 58.8         | 261        | 249.6          | 76.3         |
| 22       | 21.0         | 6.4        | 82         | 78.4 24.0                |            | 135.8            | 41.5         |            | 193.2          | 59.1         | 262        | 250.6          | 76.6         |
| 23       | 22.0         | 6.7        | 83         | 79.4 24.3                | 143        | 136.8            | 41.8         |            | 194.1          | 59.4         | 263        | 251.5          | 76.9         |
| 24       | 23.0         |            | 84         | 80.3 24.6                | 144        | 137.7            | 42.1         | 204        | 195.1          | 59 26        | 264        | 252.5          | 77.2         |
| 25       | 23.9         | 7.3        | 85         | 81.3 24.9                |            | 138.7            | 42.4         | 205        | 196.0          | 59.9         | 265        | 253.4          | 77.5         |
| 26<br>27 | 24.9         | 7.6        | 86         | 82.2 25.1                | 146        | 139.6            | 42.7         | 206        | 197.0          | 60.2         | 266        | 254.4          | 77.8         |
| 28       | 25.8<br>26.8 | 7.9<br>8.2 | 87<br>88   | 83.225.4<br>84.225.7     | 147<br>148 | 140.6<br>141.5   | 43.0<br>43.3 | 207        | 198.0<br>198.9 | 60.5         | 267        | 255.3          | 78.1         |
| 29       | 27.7         | 8.5        | 89         | 85.1 26.0                |            | 141.5            |              | 208        | 199.9          | 60.8<br>61.1 | 268<br>269 | 256.3<br>257.2 | 78.4<br>78.6 |
| 30       | 28.7         | 8.8        | 90         | 86.1 26.3                | 150        | 143.4            | 43.9         | 210        | 200.8          | 61.4         | 270        | 258.2          | 78.9         |
| 31       | 29.6         | 9.1        | 91         | 87.0 26.6                | 151        | 144.4            | 44.1         |            | 201.8          | 61.7         | <u> </u>   |                |              |
| 32       | 30.6         | 9.4        | 92         | 88.0 26.9                | 151        | 145.4            | 44.1         | 211        | 201.7          | 62.0         | 271 272    | 259.2<br>260.1 | 79.2<br>79.5 |
| 33       | 31.6         |            | 93         | 88.9 27.2                | 153        | 146.3            | 44.7         | 213        | 203.7          | 62.3         | 273        | 261.1          | 79.8         |
| 34       | 32.5         | 9.9        | 94         | 89.9 27.5                | 154        | 147.3            | 45.0         | 214        | 204.€          | 62.6         | 274        | 262.0          | 80,1         |
| 35       | 33.5         |            | 95         | 90.8 27.8                | 155        | 148.2            | 45.3         | 215        | 205.6          | 62.9         | 275        | 263.0          | 80.4         |
| 36<br>37 | 34.4         |            | 96         | 91.8 28.1                | 156        | 149.2            | 45.6         | 216        | 206.6          | 63,2         | 276        | 263.9          | 80.7         |
| 38       | 35.4<br>36.3 |            | 97<br>98   | 92.8 28.4<br>93.7 28.7   | 157<br>158 | 150.1<br>151.1   | 45.9         | 217        | 207.5          | 63.4         | 277        | 264.9          | 81.0         |
| 39       | 37.5         |            | 99         | 94.7 28.9                |            | 152.1            | 46.2<br>46.5 | 218<br>219 | 208.5<br>209.4 | 68.7<br>64.0 | 278        | 265.9 $266.8$  | 81.3         |
| 40       | 38.3         |            | 100        | 95.6 29.2                | 160        | 153.0            | 46.8         | 220        | 210.4          | 64.3         | 280        | 267.8          | 81.9         |
| 41       | 39.2         | 19 0       | 101        | <u></u>                  |            |                  |              |            | <u> </u>       |              | !          |                |              |
| 42       | 40.2         |            | 102        | 96.6 29.5                | 161<br>162 | 154.0<br>154.9   | 47.1<br>47.4 | 221<br>222 | 211.8<br>212.8 | 64.6<br>64.9 | 281<br>282 | 268.7          | 82.2         |
| 43       | 41.1         |            | 103        | 98.530.1                 | 163        | 155.9            | 47.7         | 223        | 213.3          | 65.2         | 283        | 269.7<br>270.6 | 82.4<br>82.7 |
| 44       | 42.1         | 12.9       | 104        | 99.5 30.4                |            | 156.8            | 47.9         | 224        | 214.2          | 65.5         | 284        | 271.6          | 83.0         |
| 45       | 43.0         |            | 105        | 100.430.7                | 165        | 157.8            | 48.2         | 225        | 215.2          | 65.8         | 285        | 272.5          | 83.3         |
| 46       | 44.0         |            | 106        | 101.4,31.0               |            | 158.7            | 48.5         | 226        | 216.1          | 66.1         | 286        | 273.5          | 83.6         |
| 47<br>48 | 44.9<br>45.9 |            | 107        | 102.3 31.3               | 11         | 159.7            | 48.8         | 227        | 217.1          | 66.4         | 287        | 274.5          | 83.9         |
| 49       | 46.9         |            | 108        | 103.3 31.6<br>104.2 31.9 |            | 160.7            | 49.1<br>49.4 | 228<br>229 | 218.0<br>219.0 | 66.7<br>67.0 | 288        | 275.4          | 84.2         |
| 50       | 47.8         |            | 110        | 105.2 32.2               | 170        | 162.6            |              | 230        | 220.0          | 67.2         | 289        | 276.4<br>277.3 | 84.5<br>84.8 |
| 51       |              |            |            |                          |            |                  |              | !          | <u> </u> '     |              |            |                |              |
| 52       | 48.8<br>49.7 |            | 111<br>112 | 106.1 32.5<br>107.1 32.7 |            | 163.5            | 50.0         | 231        | 220.9          | 67.5         | 291        | 278.3          | 85.1         |
| 58       | 50.7         |            | 113        | 107.1 32.7               | 173        | 164.5<br>165.4   |              |            | 221.9 $222.8$  |              |            | 279.2          |              |
| 54       | 51.6         |            |            | 109.0 33.3               |            | 166.4            |              |            | 223.8          | 68.4         | 1          | 280.2<br>281.2 | 85.7<br>86.0 |
| 55       | 52.6         |            |            | 110.0 33.6               |            | 167.4            | 51.2         |            | 224.7          | 68.7         |            | 282.1          | 86.2         |
| 56       | 59.6         |            | 116        | 110.9 33.9               | 176        | 168.3            | 51.5         | 286        | 225.7          | 69.0         |            | 283.1          | 86.5         |
| 57<br>58 | 54.5         |            | 117        | 111.934.2                |            | 169.3            |              |            | 226.6          | <b>6</b> 9.8 |            | 284.0          | 86.8         |
| 59       | 55.5<br>56.4 |            |            | 112.8 34.5               |            | 170.2            | , ,          |            | 227.6          | 69.6         | 298        | 285.0          | 87.1         |
| 60       | 57.4         |            |            | 113.8 34.8<br>114.8 35.1 |            | $171.2 \\ 172.1$ |              |            | 228.6<br>229.5 | 69.9         |            | 285.9          | 87.4         |
|          |              |            | 1          |                          |            |                  |              | •          | 1 1            | 70.2         | 4          | 286.9          | 87.7         |
| Dist.    | Dep.         | D_Lat      | Dist.      | Dep. Dlat                | Dist.      | Dep.             | D.Lat        | Dist.      | 1 Dep.         | D.Lat        | Dist.      | l Dep. l       | D.Lat        |

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TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

|                  |              |            |            |                |                | 1             | 8 Deg          | Tees         |            |                | ~            |            |                          |
|------------------|--------------|------------|------------|----------------|----------------|---------------|----------------|--------------|------------|----------------|--------------|------------|--------------------------|
| Dist.            | D.Lat        | Dep.       | l Dist.    | D.Lat          | Dep.           |               |                |              | Dist.      | DLat           | Dep.         | Dist.      | D.Lat Dep.               |
| II               | -            |            | II         |                | <u></u>        | l <del></del> | <u> </u>       |              |            |                |              | <b> </b>   | <u> </u>                 |
| 1 2              | 1.0          |            | 61<br>62   |                | 18.9<br>19.2   | 121<br>122    | 115.1          |              | 181<br>182 | 172.1<br>173.1 | 55.9<br>56.2 | 241<br>242 | 229.274.5                |
| 3                | 2.9          |            | 63         |                | 19.5           | 13            | 117.0          |              |            | 174.0          | 56.6         | 243        | 231.175.1                |
| 4                | 3.8          | 1.2        | 64         |                | 19.8           | 124           | 117.9          |              | 184        | 175.0          | 56.9         | 244        | 232.175.4                |
| 5                | 4.8          |            | 65         |                | 20.1           | 125           | 118.9          |              | 185        | 175.9          | _            | 245        | 233.075.7                |
| 6                | 5.7          | 1.9        | 66         |                | 20.4           | 126           | 119.8          |              | 186        | 176.9          | 57.5         | 246        | 234.0 76.0               |
| 7                | 6.7          | 2.2        | 67         | 63.7           | 20.7           | 127           | 120.8          | 39.2         | 187        | 177.8          | 57.8         | 247        | 234.9 76.3               |
| 8                | 7.6          | 2.5        | <b>6</b> 8 |                | 21.0           |               | 121.7          | 39.6         |            | 178.8          | 58.1         | 248        | 235.976.6                |
| 9                | 8.6          | 2.8        | 69         |                | 21.3           | 129           | 122.7          | 39.9         | 189        | 179.7          | 58.4         | 249        | 236.8 76.9               |
| 10               | 9.5          | 3.1        | 70         | 66.6           | 21.6           | 130           | 123.6          | 40.2         | 190        | 180.7          | 58.7         | 250        | 237.8 77.3               |
| 11               | 10.5         | 3.4        | 71         | 67.5           | 21.9           | 131           | 124.6          | 40.5         | 191        | 181.7          | 59.0         | 251        | 238.7 77.6               |
| 12               | 11.4         | 3.7        | 72         |                | 22.2           | 132           | 125.5          | 40.8         | 192        | 182.6          | 59.3         | 252        | 239.7 77.9               |
| 13               | 12.4         | 4.0        | 73         |                | 22.6           | 133           | 126.5          | 41.1         | 193        | 183.6          | 59.6         | 253        | 240.6 78.2               |
| 14               | 13.3         | 4.3        | 74         |                | 22.9           | 134           | 127.4          |              |            | 184.5          | 59.9         | 254        | 241.6 78.5               |
| 15<br>16         | 14.3         | 4.6        | 75         |                | 23.2           | 135           | 128.4          | 41.7         | 195        | 185.5          | 60.3         | 255        | 242.5 78.8               |
| 17               | 15.2<br>16.2 | 4.9<br>5.3 | 76         |                | $23.5 \\ 23.8$ | 136           | 129.3<br>130.3 | 42.0<br>42.3 | 196<br>197 | 186.4<br>187.4 | 60.6<br>60.9 | 256<br>257 | 243.5 79.1<br>244.4 79.4 |
| 18               | 17.1         | 5.6        | 78         | 74.2           |                | 138           | 131.2          |              | 198        | 188.3          | 61.2         | 258        | 245.4 79.7               |
| 19               | 18.1         | 5.9        | 79         | 75.1           |                | 139           | 132.2          | 43.0         | 199        | 189.3          | 61.5         | 259        | 246.3 80.0               |
| 20               | 19.0         | 6.2        | 80         | 76.1           |                | 140           | 183.1          | 43.3         | 200        | 190.2          | 61.8         | 260        | 247.3 80.3               |
|                  | <u>  </u>    |            | 01         |                | !              |               |                |              | <u> </u>   | 101 0          |              |            |                          |
| 21<br>22         | 20.0         | 6.5        | 81<br>82   | 77.0<br>78.0   |                | 141<br>142    | 134.1<br>135.1 | 43.6<br>43.9 | 201<br>202 | 191.2<br>192.1 | 62.1<br>62.4 | 261<br>262 | 248.2 80.7<br>249.2 81.0 |
| 23               | 21.9         | 7.1        | .83        | 78.9           |                | 143           | 136.0          | 44.2         | 203        | 193.1          | 62.7         |            | 250.1 81.3               |
| 24               | 22.8         | 7.4        | 84         | 79.9           |                | 144           | 137.0          | 44.5         | 204        | 194.0          | 63.0         | 264        | 251.181.6                |
| 25               | 23.8         | 7.7        | 8.5        | 80.8           |                | 145           | 137.9          | 44.8         | 205        | 195.0          | 63.3         | 265        | 252.081.9                |
| 26               | 24.7         | 8.0        | 86         | 81.8           | 26.6           | 146           | 138.9          | 45.1         | 206        | 195.9          | 63.7         | 266        | 253.082.2                |
| 27               | 25.7         | 8.3        | 87         | 82.7           |                |               | 139.8          | 45.4         | 207        | 196.9          | 64.0         | 267        | 253.982.5                |
| 28               | 26.6         | 8.7        | 88         | 83.7           |                | 148           | 140.8          | 45.7         | 208        | 197.8          | 64.3         | 268        | 254.982.8                |
| 29<br>30         | 27.6         | 9.0        | 89         | 84.6           |                | 149           | 141.7          | 46.0         | 209        | 198.8          | 64.6         | 269        | 255.883.1                |
| 30               | 28,5         | 9.3        | 90         | 85.6           | 27.8           | 150           | 142.7          | 46.4         | 210        | 199.7          | 64.9         | 270        | 256.883.4                |
| 81               | 29.5         | 9.6        | 91         | 86.5           |                | 151           | 143.6          | 46.7         | 211        | 200.7          | 65.2         | 271        | 257.783.7                |
| 32               | 30.4         |            | 92         | 87.5           |                | 152           | 144.6          | 47.0         | 212        | 201.6          | 65.5         | 272        | 258.784.1                |
| 33               | 31.4         |            | 93         | 88.4           |                |               | 145.5          | 47.3         | 213        | 202.6          | 65.8         | 273        | 259.684.4                |
| 34<br>35         | 32.3<br>33.3 | 10.5       | 94<br>95   | 89.4           |                |               | 146.5          | 47.6         | 214<br>215 | 203.5<br>204.5 | 66.1<br>66.4 | 274        | 260.684.7<br>261.585.0   |
| 36               | 34.2         |            | 96         | 90.4           |                | 155<br>156    | 147.4<br>148.4 | 47.9<br>48.2 | 216        | 205.4          | 66.7         | 275<br>276 | 262.585.3                |
| 37               | 35.2         |            | 97         | 92.3           |                | 157           | 149.3          | 48.5         | 217        | 206.4          | 67.1         | 277        | 263.485.6                |
| 38               | 36.1         |            | 98         | 93.2           |                |               | 150.3          | -48.8        | 218        | 207.3          | 67.4         | 278        | 264.485.9                |
| 39               | 37.1         | 12.1       | 99         | 94.2           |                | 159           | 151.2          | 49.1         | 219        | 208.3          | 67.7         | 279        | 265.3 86.2               |
| 40               | 38.0         | 12.4       | 100        | 95.1           | 30.9           | 160           | 152.2          | 49.4         | 220        | 209.2          | 68.0         | 280        | 266.3 86.5               |
| 41               | 39.0         | 12.7       | 101        | 96.1           | 31.2           | 161           | 153.1          | 49.8         | 221        | 210.2          | 68.3         | 281        | 267.2 86.8               |
| 42               | 39.9         |            | 102        | 97.0           |                |               | 154.1          | 50.1         | 222        | 211.1          | 68.6         | 282        | 268.287.1                |
| 43               | 40.9         |            | 103        | 98.0           |                |               | 155.0          | 50.4         | 223        | 212.1          | 68.9         | 283        | 269.1 87.5               |
| 44               | 41.8         |            | 104        | 98.9           |                |               | 156.0          | 50.7         | 224        | 213.0          | 69.2         | 284        | 270.1 87.8               |
| 45               | 42.8         |            | 105        | 99.9           |                |               | 156.9          | 51.0         | 225        | 214.0          | 69.5         | 285        | 271.188.1                |
| 46<br>47         | 43.7         |            | 106        | 100.8          |                |               | 157.9          | 51.3         | 226        | 214.9          | 69.8         | 286        | 272.068.4                |
| 48               | 44.7<br>45.7 |            | 107<br>108 | 101.8<br>102.7 |                |               | 158.8<br>159.8 | 51.6         | 227<br>228 | 215.9<br>216.8 | 70.1<br>70.5 | 287        | 273.088.7<br>273.989.0   |
| 49               | 46.6         |            | 109        | 102.7          |                |               | 160.7          | 51.9<br>52.2 | 229        | 217.8          | 70.8         | 288<br>289 | 274.989.8                |
| 50               | 47.6         |            | 110        | 104.6          |                |               | 161.7          | 52.5         | 230        | 218.7          | 71.1         | 290        | 275.889.6                |
|                  | !            |            |            |                |                |               |                |              |            |                |              |            | !                        |
| 51<br>52         | 48.5         |            | 111<br>112 | 105.6<br>106.5 |                | 171           | 162.6<br>163.6 | 52.8<br>53.2 |            | 219.7 $220.6$  | 71.4         |            | 276.8 89.9<br>277.7 90.2 |
| 53               | 50.4         |            |            | 106.5          |                |               | 164.5          | 53.5         |            | 220.6          | 72.0         |            | 277.7 90.2               |
| 54               | 51.4         |            |            | 108.4          |                |               | 165.5          | 58.8         |            | 222.5          | 72.3         |            | 279.690.9                |
| 55               | 52.3         |            |            | 109.4          |                | 175           | 166.4          | 54.1         |            | 223.5          | 72.6         | 295        | 280.6 91.2               |
| 56               | 53.3         |            |            | 110.3          |                |               | 167.4          | 54.4         |            | 224.4          | 72.9         |            | 281.5 91.5               |
| 57               | 54.2         |            | 117        | 111.3          | 36.2           | 177           | 168.3          | 54.7         |            | 225.4          | 73.2         | 297        | 282.591.8                |
| 58               | 55.2         |            |            | 112.2          |                |               | 169.3          | 55.0         |            | 226.4          | 73.5         | 298        | 283.4 92.1               |
| <i>5</i> 9<br>60 | 56.1         |            |            | 113.2          |                |               | 170.2          | 55.3         | 239        | 227.3          | 73.9         | 299        | 284.492.4                |
|                  | 57.1         |            | l          | 114.1          |                |               | 171.2          |              | 240        | 228.3          | 74.2         | 300        | 285.3 92.7               |
| Dist.            | Dep.         | D.Lat      | Dist.      | l Dep.         | D.lat          | Dist.         | Dep.           | DLat         | Dist.      | l Dep.         | D.Lat        | Dist.      | Dep. D.Lat               |
| I                |              |            |            |                |                | 7             | 2 Deg          | rees.        |            | •              | · · · ·      |            |                          |

| -        |                              | IKA        | VERSI    | I AB            | LE, I        |            | Degre           |              | OF         | THE QU                           | JAL | KAN        | r.             |               |
|----------|------------------------------|------------|----------|-----------------|--------------|------------|-----------------|--------------|------------|----------------------------------|-----|------------|----------------|---------------|
| Dist     | D.Lat                        | Dep.       | Dist.    | D.Lat           | Dep.         |            |                 |              | Dist.      | D.Lat                            | en. | Dist.      | D. at          | 1 Den         |
|          | 0.9                          | 0.3        |          | <u>'</u>        |              |            |                 | 39.4         |            | .'                               |     |            | <del> </del>   |               |
| 2        | 1 9                          | 0.7        | 61       | 57.7            | 19.9<br>20.2 | 121<br>122 | 115.4           |              |            | 171.15<br>172.15                 |     | 241<br>242 | 227.9<br>228.8 |               |
| 3        | 2.8                          |            | 63       | 59.6            | 20.5         |            | 116.3           |              |            | 173.05                           |     | 243        | 229.8          |               |
| 4        | 3.8                          | 1.3        | 64       | 60.5            | 20.8         | 124        | 117.2           | 40.4         | 184        | 174.05                           |     | 244        | 230.7          |               |
| 5        | 4.7<br>5.7                   | 1.6<br>2.0 | 65<br>66 | 61.5            | 21.2         | 125        | 118.2           |              | 185        | 174.96                           |     | 245        | 231.7          |               |
| 7        | 6.6                          | 2.3        | 67       | 62.4            | 21.5<br>21.8 | 126<br>127 | 120.1           | 41.0         | 187        | 175.96<br>176.86                 |     | 246<br>247 | 232.6<br>233.5 |               |
| 8        | 7.6                          | 2.6        | 68       | 64.3            | 22.1         |            | 121.0           | 41.7         |            | 177.86                           |     | 248        | 234.5          |               |
| 9        | 8.5                          | 2.9        | 69       | 65.2            | .22.5        | 129        | 122.0           | 42.0         |            | 178.76                           |     | 249        | 235.4          |               |
| 10       | 9.5                          | 3.3        | 70       | 66.2            | 22.8         | 130        | 122.9           | 42.3         | 190        | 179.66                           | 1.9 | 250        | 236.4          | 81.4          |
| 11       | 10.4                         | 3.6        | 71       | 67.1            | 23.1         | 131        | 123.9           | 42.6         | 191        | 180.66                           |     | 251        | 237.3          |               |
| 12       | 11.3                         | 8.9        | 72       | 68.1            | 23.4         | 132        | 124.8           |              | 192        | 181.56                           |     | 252        | 238.3          |               |
| 13<br>14 | 12.3<br>13.2                 | 4.2        | 73<br>74 | 69.0<br>70.0    | 23.8<br>24.1 | 133        | 125.8<br>126.7  | 43.6         | 193<br>194 | 182.56<br>183.46                 |     | 253<br>254 | 239.2<br>240.2 |               |
| 15       | 14.2                         | 4.9        | 75       | 70 9            | 24.4         | 135        | 127.6           | 44.0         | -195       | 184.46                           |     | 255        | 241.1          |               |
| 16       | 15.1                         | 5.2        | 76       | 71.9            | 24.7         | 136        | 128.6           | 44.3         | 196        | 185.3 6                          |     | 256        | 242.1          |               |
| 17       | 16.1                         | 5.5        | 77       | 72.8            | 25.1         | 137        | 129.5           | 44.6         | 197        | 186.36                           |     | 257        | 243.0          |               |
| 18<br>19 | 17.0                         | 5.9        | 78       | 73.8            | 25.4         |            | 130.5           | 44.9         | 198        | 187.26                           |     | 258        | 243.9          |               |
| 20       | 18.0<br>18.9                 | 6.2        | 79<br>80 | 74.7<br>75.6    | 25.7<br>26.0 |            | 131.4<br>132.4  |              | 199<br>200 | 188.2 6.<br>189.1 6.             |     | 259<br>260 | 244.9<br>245.8 |               |
|          |                              | '          |          |                 |              |            |                 |              |            |                                  | 11  |            | <u> </u>       |               |
| 21<br>22 | 19.9<br>20.8                 | 6.8<br>7.2 | 81 82    | 76.6            | 26.4<br>26.7 | 141<br>142 | 133.3<br>134.3  | 45.9<br>46.2 | 201<br>202 | 190.0 6.                         |     | 261<br>262 | 246.8<br>247.7 |               |
| 23       | 21.7                         | 7.5        | 83       | 78.5            | 27.0         | 143        | 135.2           | 46.6         | 203        | 191.96                           |     |            | 248.7          |               |
| 24       | 22.7                         | 7.8        | 84       | 79.4            | 27.3         |            | 136.2           | 46.9         | 204        | 192.96                           |     |            | 249.6          |               |
| 25       | 23.6                         | 8.1        | 85       | 80.4            | 27.7         | 145        | 137.1           | 47.2         | 205        | 193.8 6                          |     | 265        | 250.6          | 86.3          |
| 26       | 24.6                         | 8.5        | 86       | 81.3            | 28.0         | 146        | 138.0           | 47.5         | 206        | 194.8 6                          |     |            | 251.5          |               |
| 27<br>28 | 25.5<br>26.5                 | 8.8<br>9.1 | 87<br>88 | 82.3<br>83.2    | 28.3<br>28.7 | 147<br>148 | 139.0           | 47.9<br>48.2 | 207<br>208 | 195.7 61<br>196.7 61             |     |            | 252.5<br>253.4 |               |
| 29       | 27.4                         | 9.4        | 89       | 84.2            | 29.0         | 149        | 139.9<br>140.9  | 48.5         | 209        | 197.668                          |     |            | 254.3          |               |
| 30       | 28.4                         | 9.8        | 90       | 85.1            | 29.3         |            | 141.8           |              | 210        | 198.66                           |     |            | 255.3          |               |
| 51       | 29.3                         | 10.1       | 91       | 86.0            | 29.6         | 151        | 142.8           | 49.2         | 211        | 199.5 68                         |     | 271        | 256.2          | 88 9          |
| 32       | 30.5                         |            | 92       | 87.0            | 30.0         |            | 143.7           | 49.5         | 212        | 200.469                          |     |            | 257.2          |               |
| 83       | \$1.2                        | 10.7       | 93       | 87.9            | 30.3         |            | 144.7           | 49.8         | 213        | 201.469                          | .3  | 273        | 258.1          | 88.9          |
| 34       | 32.1                         |            | 94       | 88.9            | 30.6         |            | 145.6           | 50.1         | 214        | 202.3 69                         |     |            | 259.1          |               |
| 35<br>36 | 33.1<br>34.0                 |            | 95<br>96 | 89.8<br>90.8    | 30.9         |            | 146.6           | 50.5         | 215        | 203.8 70                         |     |            | 260.0<br>261.0 |               |
| 37       | 35.0                         |            | 97       | 91.7            | 31.3<br>31.6 |            | 147.5<br>148.4  | 50.8<br>51.1 | 216<br>217 | 204.2 70<br>205.2 70             |     |            | 261.9          |               |
| 38       | 35,9                         |            | 98       | 92.7            | 31.9         | 158        | 149.4           | 51.4         | 218        | 206.17                           |     |            | 262.9          |               |
| 39       | 36.9                         |            | 99       | 93.6            | 32.2         | 159        | 150.3           | 51.8         | 219        | 207.1 7                          |     |            | 268.8          |               |
| 40       | 37.8                         | 13.0       | 100      | 94.6            | 32.6         | 160        | 151.3           | 52.1         | 220        | 208.0 7                          | .6  | 280        | 264.7          | 91.2          |
| 41       | 38.8                         |            | 101      | 95.5            | 32.9         | 161        | 152.2           | 52.4         | 221        | 209.0 79                         | 2.0 | 281        | 265.7          | 91.5          |
| 42       | 39.7                         |            | 102      | 96.4            | 33.2         | 162        | 153.2           | 52.7         | 222        | 209.979                          |     |            | 266.6          |               |
| 43       | 40.7                         |            | 103      | 97.4            | 33.5         | 163<br>164 | 154.1           | 59.1         | 223<br>224 | 210.9 79 $ 211.8 79$             |     |            | 267.6<br>268.5 |               |
| 45       | 42.5                         |            | 105      | 98.3            | 33.9<br>34.2 | 165        | 155.1<br>156.0  | 53.4<br>53.7 | 225        | 212.77                           |     |            | 269.5          |               |
| 46       | 43.5                         |            | 106      | 100.2           | 34.5         | 166        | 157.0           | 54.0         | 226        | 213.7 79                         |     |            | 270.4          |               |
| 47       | 41.4                         |            | 107      | 101.2           | 34.8         | 167        | 157.9           | 54.4         | 227        | 214.6 75                         |     |            | 271.4          |               |
| 48       | 45.4                         |            | 108      | 102.1           | 35.2         | 168        | 158.8           | 54.7         | 228        | 215.6 74                         |     |            | 272.3          |               |
| 49<br>50 | 46.3<br>47.3                 |            | 109      | 103.1<br>104.0  | 35.5<br>35.8 | 169<br>170 | 159.8<br>160.7  | 55.0<br>55.3 | 229<br>230 | 216.574                          |     |            | 273.3<br>274.2 |               |
|          |                              |            |          | { <del></del> } |              |            |                 |              |            |                                  | !   |            | <u> </u>       | <del></del> i |
| 51       | 48.2                         | 1          | 111      | 105.0           | 36.1         | 171        | 161.7           |              | 231        | 218.47                           | 11  |            | 275.1<br>276.1 |               |
| 52<br>53 | <b>5</b> 0.1                 |            |          | 105.9           | 36.8         |            | 162.6           |              |            | 219.47                           |     |            | 277.0          |               |
| 54       | 51.1                         |            | 114      | 107.8           | 37.1         |            | 164.5           |              | 234        | 221.3 76                         | 3.2 | 294        | 278.0          | 95.7          |
| 55       | 52.0                         | 17.9       | 115      | 108.7           | 37.4         | 175        | 165.5           | 57.0         | 235        | 222.2 76                         | 5.5 |            | 278.9          |               |
| 56       | 52.9                         |            | 116      | 109.7           | 37.8         |            | 166.4           |              |            | 228.176                          |     |            | 279.9          |               |
| 57<br>58 | <i>5</i> 3.9<br><i>5</i> 4.8 |            | 117      | 110.6           |              | 177<br>178 | 167.4.<br>168.3 |              | 237<br>238 | 224.1 7 <br>225.0 <sub> </sub> 7 |     |            | 280.8<br>281.8 |               |
| 59       | 55.8                         |            |          | 112.5           |              | 179        | 169.2           |              |            | 226.0,7                          |     |            | 282.7          |               |
| 60       | 56.7                         |            |          | 113.5           |              | 180        | 170.2           |              |            | 226.9 78                         |     |            | 283.7          |               |
| Dist.    | Dep.                         | D.Lat      | Dist.    | Dep.            | DLat         | Dist.      | Den.            | D.Lat        | Dist.      | Dep. D                           | lat | Dist.      | Dep.           | D.Lat         |
|          |                              |            |          |                 |              |            | Degr            |              |            |                                  |     |            |                |               |
|          |                              |            |          |                 |              | (1         | LUCKI           | C 604        |            |                                  |     |            |                |               |

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TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

|            |              |            |          |                |                | 1          | 2 Degi         | rees.        |            |                |              | •          |                          |
|------------|--------------|------------|----------|----------------|----------------|------------|----------------|--------------|------------|----------------|--------------|------------|--------------------------|
| Dist.      | D.Lat        | Dep.       | Dist.    | DLat           | Dep.           | Dist.      | D.Lat          | Dep.         | Dist.      | D.Lat          | Dep.         | Dist.      | D.Lat, Dep.              |
| 1          | 1.0          | 0.2        | 61       | 59.7           | 12.7           | 121        | 118.4          | 25.2         | 181        | 177.0          | 37.6         | 241        | 235.7,50.1               |
| 2          | 2.0          | 0.4        | 62       | 60.6           |                | 122        | 119.3          | 25.4         | 182        | 178.0          | 37.8         | 242        | 236.7 50.9               |
| ន          | 2.9          | 0.6        |          | 61.6           |                | 123        | 120.3          | 25.6         | 183        | 179.0          | 38.0         | 243        | 237.750.5                |
| 4          | 3.9          | 0.8        |          | 62.6           |                | 124        | 121.3          | 25.8         | 184        | 180.0          | 38.3         | 244        | 238.7 50.7<br>239.6 50.9 |
| 5          | 4.9<br>5.9   | 1.0        | 65<br>66 | 63.6<br>64.6   |                | 125<br>126 | 122.3<br>123.2 | 26.0<br>26.2 | 185<br>186 | 181.0<br>181.9 | 38.5<br>38.7 | 245<br>246 | 240.651.1                |
| 6<br>7     | 6.8          | 1.5        | 67       | 65.5           |                | 127        | 124.2          | 26.4         | 187        | 182.9          | 38.9         | 247        | 241.651.4                |
| 8          | 7.8          | 1.7        | 68       | 66.5           |                | 128        | 125.2          |              | 188        | 183.9          | 39.1         | 248        | 242.651.6                |
| 9          | 8.8          | 1.9        | 69       | 67.5           | 14.3           | 129        | 126.2          | 26.8         | 189        | 184.9          | 39.3         | 249        | 243.651.8                |
| 10         | 9.8          | 2.1        | 70       | 68.5           | 14.6           | 130        | 127.2          | 27.0         | 190        | 185.8          | 39.5         | 250        | 244.5 52.0               |
| 11         | 10.8         | 2.3        | 71       | 69.4           | 14.8           | 131        | 128.1          | 27.2         | 191        | 186.8          | 39.7         | 251        | 245.5 52.2               |
| 12         | 11.7         | 2.5        | 72       |                | 15.0           | 132        | 129.1          | 27.4         | 192        | 187:8          | 39.9         | 252        | 246.552.4                |
| 13         | 12.7         | 2.7        | 73       | 71.4           |                | 133        | 130.1          | 27.7         | 193        | 188.8          | 40.1         | 253        | 247.552.6                |
| 14         | 13.7         | 2.9        | 74<br>75 | 72.4           | 15.4           | 134        | 131.1          | 27.9         | 194        | 189.8          | 40.3         | 254        | 248.4 52.8<br>249.4 53.0 |
| 15<br>16   | 14.7<br>15.7 | 3.1<br>3.3 | 76       |                | 15.8           | 135<br>136 | 132.0<br>133.0 | 28.1<br>28.3 | 195        | 190.7          | 40.5<br>40.8 | 255<br>256 | 250.453.2                |
| 17         | 16.6         | 3.5        | 77       |                | 16.0           | 137        | 134.0          |              | 197        | 192.7          | 41.0         | 257        | 251.453.4                |
| 18         | 17.6         | 3.7        | 78       |                | 16.2           | 138        | 135.0          | 28.7         | 198        | 193.7          | 41.2         | 258        | 252.4 53.6               |
| 19         | 18.6         | 4.0        | 79       |                | 16.4           | 139        | 136.0          | 28.9         | 199        | 194.7          | 41.4         | 259        | 253.3 53.8               |
| 20         | 19.6         | 4.2        | 80       | 78.3           | 16.6           | 140        | 136.9          | 29.1         | 200        | 195.6          | 41.6         | 260        | 254.3 54.1               |
| 21         | 20.5         | 4.4        | 81       |                | 16.8           | 141        | 137.9          | 29.3         | 201        | 196.6          | 41.8         | 261        | 255.9 54.3               |
| 22         | 21.5         | 4.6        |          |                | 17.0           | 142        | 138.9          | 29.5         | 202        | 197.6          | 42.0         | 262        | 256.354.5                |
| '23        | 22.5         | 4.8        | 83       |                | 17.3           | 143        | 139.9          |              | 203        | 198.6          | 42.2         | 263        | 257.3 54.7               |
| 24         | 23.5         | 5.0        | 84<br>85 |                | 17.5<br>17.7   | 144        | 140.9          |              | 204        | 199.5          | 42.4         | 264<br>265 | 258.254.9                |
| 25<br>26   | 24.5<br>25.4 | 5.1<br>5.4 |          |                | 17.9           | 145        | 141.8<br>142.8 | 30.1<br>30.4 | 205        | 200.5<br>201.5 | 42.8         | 266        | 259.2 55.1<br>260.2 55.8 |
| 27         | 26.4         | 5.6        | 87       | 85.1           |                | 147        | 143.8          | 30.6         | 207        | 202.5          | 43.0         | 267        | 261.255.5                |
| 28         | 27.4         | 5.8        |          |                | 18.3           |            | 144.8          | 30.8         |            | 203.5          |              | 268        | 262.1 55.7               |
| 29         | 28.4         | 6.0        | 89       |                | 18.5           | 149        | 145.7          | 31.0         | 209        | 204.4          | 43.5         | 269        | 263.1 55.9               |
| 30         | 29.3         | 6.2        | 90       | 88.0           | 18.7           | 1.50       | 146.7          | 31.2         | 210        | 205.4          | 43.7         | 270        | 264.1 56.1               |
| 31-        | 30.3         | 6.4        | 91       | 89.0           | 18.9           | 151        | 147.7          | 31.4         | 211        | 206.4          | 43.9         | 271        | 265.156.3                |
| 32         | 81.3         | 6.7        | 92       |                | 19.1           | 152        | 148.7          | 31.6         | 212        | 207.4          | 44.1         | 272        | 266.1 56.6               |
| 3 <b>3</b> | 32.3         | 6.9        | 93       |                | 19.3           | 153        | 149.7          | 31.8         | 213        | 208.3          | 44.3         | 273        | 267.056.8                |
| 34         | 33.3<br>34.2 | 7.1<br>7.3 | 94<br>95 |                | $19.5 \\ 19.8$ | 154<br>155 | 150.6          | 32.0         | 214        | 209.3          |              | 274<br>275 | 268.057.0                |
| 35<br>36   | 35.2         | 7.5        | 96       |                | 20.0           | 156        | 151.6<br>152.6 | 32.2<br>32.4 | 215<br>216 | 210.3          | 44.9         | 276        | 269.057.2<br>270.057.4   |
| 37         | \$6.2        | 7.7        | 97       |                | 20.2           | 157        | 153.6          | 32.6         | 217        | 212.3          | 45.1         | 277        | 270.957.6                |
| 38         | 37.2         | 7.9        | 98       | 95.9           | 20.4           | 158        | 154.5          |              | 218        | 213.2          |              | 278        | 271.957.8                |
| 39         | 38.1         | 8.1        | 99       |                | 20.6           | 159        | 155.5          | 33.1         | 219        | 214.2          |              | 279.       | 272.958.0                |
| 40         | 39.1         | 8.3        | 100      | 97.8           | 20.8           | 160        | 156.5          | 38.3         | 220        | 215.2          | 45.7         | 280        | 273.958.2                |
| 41         | 40.1         | 8.5        | 101      | 98.8           | 21.0           | 161        | 157.5          | 33.5         | 221        | 216.2          | 45.9         | 281        | 274.9 58.4               |
| 42         | 41.1         | 8.7        |          |                | 21.2           | 162        | 158.5          | 33.7         | 222        | 217.1          | 46.2         | 282        | 275.8 58.6               |
| 43         | 42.1         | 8.9        | 103      | 100.7          |                | 163        | 159.4          |              | 223        | 218.1          | 46.4         | 283        | 276.858.8                |
| 44<br>45   | 43.0<br>44.0 |            | 104      | 101.7<br>102.7 |                | 164<br>165 | 160.4          |              | 224<br>225 | 219.1<br>220.1 | 46.6         | 284        | 277.859.0                |
| 46         | 45.0         |            | 106      | 103.7          |                | 166        | 161.4<br>162.4 |              | 225        | 221.1          | 46.8<br>47.0 | 285<br>286 | 278.859.3<br>279.859.5   |
| 47         | 46.0         | 9.8        |          | 104.7          |                | 167        | 163.4          |              | 227        | 222.0          |              | 287        | 280.7.59.7               |
| 48         | 47.0         | 10.0       | 108      | 105.7          |                | 168        | 164.8          | 34.9         | 228        | 223.0          | 47.4         | 288        | 281.7,59.9               |
| 49         | 47.9         | 10.2       | 109      | 106.6          |                |            | 165.3          | 35.1         | 229        | 224.0          | 47.6         | 289        | 282.7,60.1               |
| 50         | 48.9         | 10.4       | 110      | 107.6          | 22.9           | 170        | 166.3          | <b>35.</b> 3 | 230        | 225.0          | 47.8         | 290        | 283.7,60.3               |
| 51         | 49.9         | 10.6       | 111      | 108.6          |                | 171        | 167.3          | 35.6         | 231        | 226.0          | 48.0         | 291        | 284.6,60.5               |
| 52         | 50.9         | 10.8       |          | 109.6          |                |            | 168.2          | 35.8         |            | 226.9          |              |            | 285.6 60.7               |
| 58<br>54   | 21.8         | 11.0       | 113      | 110.5          |                |            | 169.2          |              | 233        | 227.9          |              | 293        | 286.6.60.9               |
| 55         |              | 11.4       |          | 111.5<br>112.5 |                | 174        | 170.2<br>171.2 |              | 234<br>235 | 228.9<br>229.9 |              |            | 287.6,61.1<br>288.661.3  |
| 56         |              | 11.6       |          | 113.5          |                | 176        | 172.2          |              | 11         | 230.8          |              | 296        | 289.561.5                |
| 57         | 55.8         | 11.9       | 117      | 114.4          |                |            | 178.1          |              |            | 231.8          | 49.3         |            | 290.561.7                |
| 58         |              | 12.1       | 118      | 115.4          | 24.5           | 178        | 174.1          | 37.0         | 238        | 232.8          | 49.5         | 298        | 291.562.0                |
| 59         | 57.7         |            |          | 116.4          |                | 179        | 175.1          | 37.2         | 239        | 283.8          | 49.7         | 299        | 292.5,62.2               |
| 60         | 58.7         |            |          | 117.4          |                |            | 176.1          |              |            | 234.8          |              | 300        | 293.4 62.4               |
| Dist.      | Dep.         | D.Lat      | Dist.    | Dep.           | D.lat          | Dist.      | Dep.           | DLat         | Dist.      | Dep.           | D.Lat        | Dist.      | Dep. D.Lat               |
|            |              |            |          |                | ``             |            | 8 Deg          |              |            |                | ·            |            |                          |

TABLE XIII.

|            |              | IKAV         | EKSE     | IAD            | UE, 1               |             |                |              | E OF        | IFIE           | QUAD         | KAN        | · · · · · · · · · · · · · · · · · · · |
|------------|--------------|--------------|----------|----------------|---------------------|-------------|----------------|--------------|-------------|----------------|--------------|------------|---------------------------------------|
| Diet       | D I at       | Dep.         | Dist.    | DIa            | Don                 | Dia         | 3 Deg          | Dep.         | Dist        | D.Lat          | D 1          | · Dia      | ID Last Das                           |
| 1          |              |              |          |                |                     | Dist.       | D.L.at         |              |             | <u> </u>       |              | Dist.      | D.Lat Dep                             |
| 1          | 1.0          | 0.2          | 61       | 59.4           |                     | 121         | 117.9          | 27.2         | 181         | 176.4          | 40.7         | 241        | 234.8 54.2                            |
| 2 3        | 1.9<br>2.9   |              | 62<br>63 |                | 13.9<br>14.2        | 122<br>123  | 118.9<br>119.8 | 27.4         | 182<br>189  | 177.3<br>178.3 | 40.9<br>41.2 | 242<br>243 | 235.8 54.4<br>236.8 54.7              |
| 4          | 3.9          | 0.9          | 64       |                | 14.4                |             | 120.8          | 27.9         | 184         | 179.3          | 41.4         | 243        | 237.7 54.9                            |
| 5          | 4.9          | 1.1          | 65       | 63.3           | 14.6                | 125         | 121.8          | 28.1         | 185         | 180.3          | 41.6         | 245        | 238.7 55.1                            |
| 6          | 5.8          | 1.3          | 66       | 64.3           | 14.8                | 126         | 122.8          | 28.3         | 186         | 181.2          | 41.8         | 246        | 239.7 55.3                            |
| 7          | 6.8          | 1.6          | 67       | 65.3           |                     | 127         | 123.7          | 28.6         | 187         | 182.2          | 42.1         | 247        | 240.7 55.6                            |
| 8<br>9     | 7.8<br>8.8   | 1.8          | 68<br>69 | 67.2           | 15.3                | 128<br>129  | 124.7<br>125.7 | 28.8<br>29.0 | 188         | 183.2          | 42.3         | 248        | 241.6 55.8<br>242.6 56.0              |
| 10         | 9.7          | 2.2          | 70       | 68.2           |                     | 130         | 126.7          | 29.0         | 190         | 184.2<br>185.1 | 42.5<br>42.7 | 249<br>250 | 243.6 56.2                            |
| l          |              |              |          |                |                     |             |                |              |             | <u> </u>       |              |            |                                       |
| 11<br>12   | 10.7<br>11.7 | 2.5          | 71       | 69.2<br>70.2   |                     | 131         | 127.6          | 29.5         | 191         | 186.1          | 43.0         | 251        | 244.6 56.5<br>245.5 56.7              |
| 13         | 12.7         | 2.9          | 72<br>73 |                | 16.4                | 132<br>133  | 128.6<br>129.6 | 29.7<br>29.9 | 192<br>193  | 187.1<br>188.1 | 43.2<br>43.4 | 252<br>253 | 246.5 56.9                            |
| 14         | 13.6         | 3.1          | 74       | 72.1           |                     | 134         | 130.6          | 30.1         | 194         | 189.0          | 43.6         | 254        | 247.5 57.1                            |
| 15         | 14.6         | 3.4          | 75       | 73.1           | 16.9                | 135         | 131.5          | 30.4         | 195         | 190.0          | 43.9         | 255        | 248.5 57.4                            |
| 16         | 15.6         | 3.6          | 76       | 74.1           |                     | 136         | 132.5          | 30.6         | 196         | 191.0          | 44.1         | 256        | 249.4 57.6                            |
| 17<br>18   | 16.6<br>17.5 | 3.8          | 77       |                | 17.3                | 137         | 133.5          | 30.8         | 197         | 192.0          | 44.3         | 257        | 250.4 57.8                            |
| 19         | 18.5         | 4.0          | 78<br>79 | 77.0           | 17.5                | 138<br>139  | 134.5<br>135.4 | 31.0<br>31.3 | 198<br>199  | 192.9<br>193.9 | 44.5<br>44.8 | 258<br>259 | 251.4'58.0<br>252.4'58.3              |
| 20         | 19.5         | 4.5          | 80       |                | 18.0                | 140         | 136.4          | 31.5         | 200         | 194.9          | 45.0         | 260        | 253.358.5                             |
| 21         | 20.5         | 4.7          |          | 78.9           |                     |             |                |              |             |                |              |            | 254.3 58.7                            |
| 22         | 20.5         | 4.9          | 81<br>82 | 79.9           |                     | 141<br>142  | 137.4<br>138 4 | 31.7<br>31.9 | 201<br>202  | 195.8<br>196.8 | 45.2<br>45.4 | 261<br>262 | 254.3 58.7<br>255.3 58.9              |
| 23         | 22.4         | 5.2          | 83       |                | 18.7                | 143         | 139.3          | 32.2         | 203         | 197.8          | 45.7         | 263        | 256.3 59.2                            |
| 24         | 23.4         | 5.4          | 84       |                | 18.9                |             | 140.3          | 32.4         | 204         | 198.8          | 45.9         | 264        | 257.2 59.4                            |
| 25         | 24.4         | 5.6          | 85       |                | 19.1                |             | 141.3          | 32.6         | 205         | 199.7          | 46.1         | 265        | 258.259.6                             |
| 26         | 25.3         | 5.8          | 86       | 83.8           |                     | 146         | 142.8          | 32.8         | 206         | 200.7          | 46.3         | 266        | 259.259.8                             |
| 27<br>28   | 26.3<br>27.3 | 6.1          | 87<br>88 |                | $\frac{19.6}{19.8}$ |             | 143.2<br>144.2 | 33.1<br>33.3 | 207<br>208  | 201.7<br>202.7 | 46.6<br>46.8 | 267<br>268 | 260.2 60.1<br>261.1 60.3              |
| 29         | 28.3         | 6.5          | 89       |                | 20.0                | 149         | 145.2          | 33.5         | 209         | 203.6          | 47.0         | 269        | 262.1 60.5                            |
| 30         | 29.2         | 6.7          | 90       | 87.7           |                     | 150         | 146.2          | 33.7         | 210         | 204.6          | 47.2         | 270        | 263.160.7                             |
| 31         | 30.2         | 7.0          | 91       | 88.7           | 20.5                | 151         | 147.1          | 34.0         | 211         | 205.6          | 47.5         | 271        | 264.1.61.0                            |
| 32         | 31.2         | 7.2          | 92       | 89.6           |                     | 152         | 148.1          | 34.2         | 212         | 206.6          | 47.7         | 272        | 265.0 61.2                            |
| <b>3</b> 3 | 32.2         | 7.4          | 93       | 90.6           | 20.9                | 153         | 149.1          | 34.4         | 213         | 207.5          | 47.9         | 273        | 266.0 61.4                            |
| 34         | 33.1         | 7.6          | 94       | 91.6           |                     | 154         | 150.1          | 34.6         | 214         | 208.5          | 48.1         | 274        | 267.061.6                             |
| 35<br>36   | 34.1<br>35.1 | 7.9<br>8.1   | 95<br>96 |                | 21.4<br>21.6        | 155         | 151.0          | 34.9<br>35.1 | .215        | 209.5          | 48.4         | 275<br>276 | 268.0 61.9<br>268.9 62.1              |
| 37         | 36.1         | 8.3          | 97       |                | 21.8                | 156<br>157  | 152.0<br>153.0 | 35.3         | 216<br>21,7 | 210.5<br>211.4 | 48.6<br>48.8 |            | 269.962.3                             |
| 38         | 37.0         | 8.5          | 98       |                | 22.0                | 158         | 154.0          | 35.5         | 218         | 212.4          | 49.0         | 278        | 270.962.5                             |
| 39         | 38.0         |              | 99       |                | 22.3                | 159         | 154.9          | 35.8         | 219         | 213.4          | 49.3         | 279        | 271.8 62.8                            |
| 40         | 39.0         | 9.0          | 100      | 97.4           | 22.5                | 160         | 155.9          | 36.0         | 220         | 214.4          | 49.5         | 280        | 272.8 63.0                            |
| 41         | 39.9         | 9.2          | 101      | 98.4           | 22.7                | 161         | 156.9          | 36.2         | 221         | 215.3          | 49.7         | 281        | 273.8 63.2                            |
| 42         | 40.9         |              | 102      |                | 22 9                | 162         | 157.8          | 36.4         | 222         | 216.3          | 49.9         | 282        | 274.8 69.4                            |
| 43<br>44   | 41.9<br>42.9 |              | 103      | 100.4          |                     | 163         | 158.8          | 36.7         | 223         | 217.8          | 50.2         | 288        | 276.7 63.7<br>276.7 63.9              |
| 45         | 43.8         |              | 104      | 101.3<br>102.3 |                     | 164<br>165  | 159.8<br>160.8 | 36.9<br>37.1 | 224<br>225  | 218.3<br>219.2 | 50.4<br>50.6 | 284<br>285 | 277.7,64.1                            |
| 46         |              | 10.3         | 106      | 103.3          |                     | 166         | 161.7          | 37.3         | 226         | 220.2          | 50.8         | 286        | 278.7 64.3                            |
| 47         | 45.8         | 10.6         | 107      | 104.3          | 24.1                | 167         | 162.7          | 37.6         | 227         | 221.2          | 51.1         | 287        | 279.664.6                             |
| 48         |              | 10.8         | 108      | 105.2          |                     | 168         | 163.7          | 37.8         | 228         | 222.2          | 51.8         | 288        | 280.661.8                             |
| 49<br>50   |              | 11.0<br>11.2 | 109      | 106.2          |                     | 169         | 164.7          | 38.0         | 229<br>230  | 223.1<br>224.1 | 51.5         | 289<br>290 | 281.665.0<br>282.665.2                |
|            |              |              | <b></b>  | 107.2          |                     | 170         | 165.6          | 38.2         | <u> </u>    | '              | 51.7         |            | <u> </u>                              |
| 51         |              | 11.5         | 111      | 108.2          | 25.0                | 171         | 166.6          | 38.5         | 231         | 225.1          | 52.0         | 291        | 283.565.5                             |
| 52<br>53   |              | 11.7         |          | 109.1<br>110.1 |                     |             | 167.6          |              | 232<br>233  | 226.1<br>227.0 | 52.2<br>52.4 |            | 284.5 65.7<br>285.5 65.9              |
| 54         |              | 12.1         |          | 111.1          |                     |             | 168.6<br>169.5 |              | 234         | 228.0          |              | 1          | 286.5 66.1                            |
| <b>5</b> 5 | 53.6         | 12.4         |          | 112.1          |                     | 175         | 170.5          |              | 235         | 229.0          |              | 295        | 287.466.4                             |
| <b>5</b> 6 |              | 12.6         | 116.     | 113.0          | 26.1                |             | 171.5          | 39.6         |             | 230.0          | 53.1         | 296        | 288.466.6                             |
| 57         |              | 12.8         | 117      | 114.0          |                     |             | 172.5          |              | 237         | 230.9          |              | 297        | 289.466.8                             |
| 58<br>59   |              | 13.0<br>13.3 | 118      | 115.0          |                     |             | 173.4<br>174.4 |              | 238<br>239  | 231.9<br>232.9 |              | 298<br>299 | 290.467.0<br>291.367.3                |
| 60         |              | 13.5         | 120      | 116.9          |                     |             | 175.4          |              | 240         | 232.9          |              |            | 292.3 67.5                            |
| !          |              | DLat         |          |                | 1                   | 1           | ·              | I            |             | -!             |              |            |                                       |
| 136.       | Dep.         | ·DT'SE       | 1381     | Dep.           | m.iat               | <del></del> |                |              | J LIST.     | Dep.           | 1E-L-1       | Dist.      | Dep. ID.La                            |
| -          |              |              |          |                |                     | 7           | 77 Deg         | rees.        |             |                |              |            |                                       |

TABLE XIII.

14 Degrees. D.Lat | Dep. Dist. D.Lat Dep. Dist. D.Lat Dep. Dist. D.Lat Dep. Dep. Dist. Dist. D.Lat 233.8 58.3 1.0 0.2 61 59.2 14.8 121 117.4 29.3 181 175.6 43.8 241 1.9 60.2 15.0 234.8 58.5 0.5 122 176 - 6 242 62 118.4 29.5 182 44.0 2 61.1 15.2 62.1 15.5 63.1 15.7 235.8 58.8 3 **Ż**.9 0.7 63 123 119.3 29.8 183 177.6 44.3 243 236.8 59.0 244 4 3,9 1.0 64 124 120.8 30.0 184 178.5 44.5 237.7 59.3 4.9 1.2 65 179.5 44.8 245 5 125 121.3 30.2 185 6 5.8 1.5 66 64.0 16.0 126 122.3 30.5 186 180.5 45.0 246 238.7 59.5 239.7 59.8 7 6.8 1.7 67 65.0 16.2 127 123.2 30.7 187 181.4 45.2 247 240.6 60.0 8 7.8 1.9 68 66.0 16.5 128 124.2 31.0 188 182.4 45.5 248 241.6 60.2 9 8.7 2.2 69 67.0 16.7 129 125.2 31.2 189 183.4 45.7 249 10 9 7 2.4 70 67.9 16.9 250 242.6 60.5 130 126.1 31.4 190 184.4 46.0 10.7 2.7 71 68.9 17.2 185.3 251 243.5 60.7 11 12 127.1 31.7 46.2 131 191 69.9 17.4 128.1 252 244.5 61.0 11.6 2.9 72 132 31.9 192 186.3 46.4 253 13 12.6 3.1 73 70.8 17.7 129.0 32.2 187.3 245.5 61.2 133 193 46.7 246.5 61.4 14 13.6 3.4 74 71.8 17.9 254 32.4 188.2 134 130.0 194 46.9 131.0 132.0 255 247.4 61.7 15 14.6 3.6 75 72.7 18,1 135 32.7 195 189.2 47.2 248.4 61.9 16 15.5 3.9 76 73.7 18.4 32.9 190.2 47.4 256 136 196 77 74.7 18.6 33.1 257 249.4 62.2 17 16.5 4.1 137 132.9 197 191.1 47.7 17.5 78 75.7 18.9 258 250.3 62.4 18 4.4 138 133.9 33.4 198 192.1 47.9 48.1 259 251.3 62 7 19 18.4 4.6 79 76.7 19.1 139 134.9 33.6 199 193.1 20 19.4 4.8 77.6 19.4 33.9 194.1 260 257.3 62.9 80 140 135.8 200 48.4 21 20.4 5.1 78.6 19.6 141 136.8 34.1 195.0 48.6 261 253.2 63.1 81 201 34.4 254.2 63.4 22 21.3 5.3 82 79.6 19.8 142 137.8 202 196.0 48.9 262 255.2 63.6 23 22.3 80.5 20.1 34.6 263 5.6 83 143 138.8 203 197.0 49.1 81.5 20.3 139.7 256.2 63.9 24 23.3 84 144 34.8 264 5.8 204 197.9 49.4 25 24.3 6.0 85 82.5 20.6 145 140.7 35.1 205 198.9 49.6 265 257.1 64.1 83.4 20.8 26 25.2 146 35.3 266 258.1 64.4 6.3 86 141.7 206 199.9 49.8 26.2 142.6 27 6.5 87 84.4 21.0 147 35.6 207 200.9 50.1 267 259.1 64.6 85.4 21.3 143.6 260.0 64.8 28 27.2 6.8 88 148 35.8 208 201.8 50.3 268 86.4 21.5 261.0 65.1 28.1 144.6 36.0 209 202.8 29 7.0 89 149 50.6 269 87.3 21.8 262.0 65.3 30 29.1 7.3 90 1.50 145.5 36.3 210 203.8 50.8 270 31 30.1 7.5 91 88.3 22.0 151 146.5 36.5 211 204.7 51.0 271 263.0,65.6 32 31.Ò 7.7 92 89.3 22.3 152 147.5 36.8 212 205.7 51.3 272 263.9 65.8 264.9 66.0 265.9 66.3 37.0 33 32.0 8.0 93 90.2 22.5 91.2 22.7 153 148.5 213 206.7 51.5 273 34 33.0 94 154 149.4 274 8.2 37.3 214 207.6 51.8 37.5 37.7 266.8 66.5 92.2 23.0 150.4 275 35 34.0 8.5 95 155 215 208.6 52.0 93.1 23.2 209.6 52.3 267.8 66.8 36 34.9 8.7 96 156 151.4 216 276 37 35.9 9.0 97 94.1 23.5 157 152.3 38.0 217 210.6 52.5 277 268.8 67.0 36.9 95.1 23.7 38.2 278 269.7 67.3 38 9.2 98 158 153.3 52.7218 211.5 96.1 24.0 97.0 24.2 38.5 38.7 37.8 270.7 67.5 39 9.4 99 159 154.3 219 212.5 53.0 279 271.7 67.7 38.8 9.7 40 100 160 155.2 220 213.5 53.2 280 39.8 9.9 101 98.0 24.4 161 156.2 281 272.7 68.0 41 38.9 221 214.4 53.5 40.8 10.2 99.0 24.7 273.6 68.2 42 102 162 157.2 39.2 222 215.4 282 53.7 41.7 10.4 43 103 99.9 24.9 168 158.2 39.4 223 216.4 53.9 283 274.6 68.5 39.7 275.6 68.7 44 284 42:7 10.6 104 100.9 25.2 164 159.1 224 217.3 54.2 101.9 25.4 276.5 68.9 45 43.7 10.9 105 165 160.1 39.9 225 218.3 54.4 285 46 44.6 11.1 106 102.9 25.6 166 161.1 40.2 226 219.3 54.7 286 277.5 69.2 47 45.6 11.4 107 103.8 25.9 167 162.0 40.4 227 54.9 287 278.5 69.4 220.3 48 46.6 11.6 108 104.8 26.1 168 163.0 40.6 228 221.255.2 288 279.4 69.7 289 280.4 69.9 49 47.5 11.9 109 105.8 26.4 169 164.0 40.9 229 |222.2|55.4 281.4 70.2 50 48.5 12.1 110 106.7 26.6 170 165.0 41.1 230 55.6 290 223.2 49.5 12.3 107.7 26.9 55.9 51 111 171 165.9 41.4 231 224.1 291 282.4 70.4 283.3 70.6 284.3 70.9 108.7 27.1 52 50.5 12.6 172 166.9 232 56.1 292 112 41.6 225.1 51.4 12.8 109.6 27.3 53 113 173 167.9 41.9 233 226.1 56.4 293 52.4 13.1 110.6 27.6 227.0 285.3 71.1 54 114 174 188.8 42.1 234 56.6 294 55 56.9 53.4 13.8 115 111.6 27.8 175 169.8 42.3 235228.0 295 286.2 71.4 56 54.3 13.5 112,6 28.1 42.6 236 287.2 71.6 116 176 170.8 229.0 296 57.1 288.2 71.9 237 57 55.8 13.8 117 113.5 28.3 177 171.7 42.8 230.0 57.3 297 56.3 14.0 289.1 72.1 58 118 114.5 28.5 172.7 238 178 43.1 230.9 57.6 298 290.172.3 57.2 14.3 59 119 115.5 28.8 179 173.7 43.3 239 231.9 57.8 299 116.4 29.0 300 291.172.6 60 58.2 14.5 120 180 174.7 43.5 240 232.9 58.1 Dist. Dep. D.Lat 76 Degrees.

### TABLE XIII.

|          |              | <del></del>  |          |                | <u></u>             |            | 5 Deg          | TPPS.        |            |                | ~             |            |                |          |
|----------|--------------|--------------|----------|----------------|---------------------|------------|----------------|--------------|------------|----------------|---------------|------------|----------------|----------|
| Dist.    | D.Lat        | Dep.         | Dist.    | D. Lat         | Den.                |            | D.Lat          |              | Dist.      | D.Lat          | Den.          | Dist.      | D.Lat          | 1 Den    |
| <u> </u> | I———         |              |          |                | <u>-</u> -          |            |                |              |            |                |               |            |                | <u> </u> |
| 1<br>2   | 1.0<br>1.9   | 0.8          | 61 62    |                | 15.8<br>16.0        | 121<br>122 | 116.9<br>117.8 | 31.3<br>31.6 | 181        | 174.8<br>175.8 | 46.8<br>47.1  | 241<br>242 | 232.8<br>233.8 |          |
| 3        | 2,9          | 0.8          | 63       |                | 16.3                | 123        | 118.8          |              | 183        | 176.8          |               |            | 234.7          |          |
| 4        | 3.9          | 1.0          | 64       |                | 16.6                | 124        | 119.8          | 32.1         | 184        | 177.7          | 47.6          |            |                | 63.2     |
| 5        | 4.8          | 1.8          | 65       |                | 16.8                |            | 120.7          | 32.4         | 185        | 178.7          | 47.9          | 245        | 236.7          |          |
| 6        | 5.8          | 1.6          | 66       |                | 17.1                |            | 121.7          | 32.6         |            | 179.7          | 48.1          | 246        | 237.6          |          |
| 7        | 6.8          | 1.8          | 67       | 64.7           | 17.3                | 127        | 122.7          | 32.9         | 187        | 180.6          | 48.4          | 247        | 238.6          | 63.9     |
| 8        | 7.7          | 2.1          | 68       |                | 17.6                |            | 123.6          | 33.1         |            | 181.6          | 48.7          | 248        | 239.5          |          |
| 9        | 8.7          | 2.3          | 69       |                | 17.9                |            | 124.6          | 33.4         | 189        | 182.6          | 48.9          | 249        | 240.5          |          |
| 10       | 9.7          | 2.6          | 70       | 67.6           | 18.1                | 130        | 12546          | 33.6         | 190        | 183.5          | 49.2          | 250        | 241.5          | 04.7     |
| 111      | 10.6         | 2.8          | 71       | 68.6           | 18.4                | 131        | 126.5          | 33.9         | 191        | 184.5          | 49.4          | 251        | 242.4          | 65.0     |
| 12       | 11.6         | 3.1          | 72       |                | 18.6                | 132        | 127,5          | 34.2         | 192        | 185.5          | 49.7          | 252        | 243.4          |          |
| 13       | 12.6         | 3.4          | 73       |                | 18.9                | 133        | 128.5          | 34.4         | 193        | 186.4          |               |            | 244.4          |          |
| 114      | 13.5         |              | 74       |                | 19.2                | 134        | 129.4          | 34.7         | 194        | 187.4          |               |            | 245.3          |          |
| 15       | 14.5<br>15.5 | 3.9<br>4.1   | 75       |                | 19.4                |            | 130.4          | 34.9         | 195        | 188.4          |               | 255        | 246.3          |          |
| 16<br>17 | 16.4         |              | 76<br>77 |                | 19.7<br>19.9        |            | 131.4<br>132.3 | 35.2<br>35.5 |            | 189.3          |               | 256<br>257 | 247.3<br>248.2 |          |
| 18       | 17.4         |              | 78       |                | 20.2                |            | 133.3          | 35.7         | 198        | 191.3          |               | 258        | 249.2          |          |
| 19       | 18.4         |              | 79       |                | 20.4                |            | 194.3          |              |            | 192.2          | 51.5          | 259        | 250.2          |          |
| 20       | 19.3         |              | 80       |                | 20.7                | 140        | 135.2          | 36.2         | 200        | 193.2          | 51.8          | 260        | 251.1          |          |
| 21       | 20.3         | 5.4          | 01       | ļ              | 21.0                |            | ·              |              |            | _!             | 50 0          | <u> </u>   | 252.1          | ·        |
| 22       | 21.3         |              | 81<br>82 |                | $\frac{21.0}{21.2}$ | 141<br>142 | 136.2<br>137.2 | 36.5<br>36.8 | 201        | 194.2<br>195.1 | 52.0<br>52.3  | 261<br>262 | 252.1          |          |
| 23       | 22.2         |              | 83       |                | 21.5                |            | 138.1          | 37.0         | 11         | 196.1          | 52.5          | 263        | 254.0          |          |
| 24       | 23.2         |              | 84       |                | 21.7                |            | 139.1          |              | 204        | 197.0          |               | 264        | 255.0          |          |
| 25       | 24.1         |              | 85       |                | 22.0                | 145        | 140.1          | 37.5         | 11         | 198.0          |               | 265        | 256.0          |          |
| 26       | 25.1         | 6.7          | 86       | 83.1           | 22.3                | 146        | 141.0          |              | 206        | 199.0          | 53.3          | 266        | 256.9          | 68.8     |
| 27       | 26.1         | 7.0          | 87       |                | 22.5                |            | 142.0          | 38.0         | 237        | 199.9          | 53.6          | 267        | 257.9          |          |
| 28       | 27.0         |              | 88       |                | 22.8                |            | 143.0          | 38.3         |            | 200.9          | 53.8          | 268        | 258.9          |          |
| 29       | 28.0         |              | 89       |                | 25.0                | _          | 143.9          | 38.6         | 209        | 201.9          |               | 269        | 259.8          |          |
| 30       | 29.0         | 7.8          | 90       | 86.9           | 23.3                | 150        | 144.9          | 38.8         | 210        | 202.8          | 54.4          | 270        | 260.8          | 09.9     |
| 31       | 29.9         | 8.0          | 91       | 87.9           | 23.6                | 151        | 145.9          | 39.1         | 211        | 203.8          | 54.6          | 271        | 261.8          | 70.1     |
| 32       | 30.9         |              | 92       |                | 23.8                | 152        | 146.8          | 39.3         |            | 204.8          | 54.9          | 272        | 262.7          |          |
| 33       | 31.9         |              | 93       |                | 24.1                | 153        | 147.8          | 39.6         |            | 205.7          | 55.1          | 273        | 263.7          |          |
| 34       | 32.8         |              | 94       |                | 24.8                | 154        | 148.8          | 39.9         | 214        | 206.7          | 55.4          | 274        | 264.7          |          |
| 35<br>36 | 33.8<br>34.8 |              | 95<br>96 |                | 24.6<br>24.8        | 155<br>156 | 149.7<br>150.7 | 40.1         | 215<br>216 | 207.7<br>208.6 | .55.6<br>55.9 |            | 265.6<br>266.6 |          |
| 37       | 35.7         |              | 97       |                | 25.1                | 157        | 151.7          | 40.4         | 217        | 209.6          | 56.2          | 276<br>277 | 267.6          |          |
| 38       | 36.7         |              | 98       |                | 25.4                |            | 152.6          | 40.9         | 218        | 210.6          | 56.4          | 278        | 268.5          |          |
| 39       | 37.7         |              | 99       |                | 25.6                | 159        | 153.6          | 41.2         | 219        | 211.5          | 56.7          | 279        | 269.5          |          |
| 40       | 38.6         | 10.4         | 100      | 96.6           | 25.9                | 160        | 154.5          | 41.4         | 220        | 212.5          | 56.9          | 280        | 270.5          | 72.5     |
| 41       | 39.6         | 10.6         | 101      | 97.6           | 26.1                | 161        | 155.5          | 41.7         | 221        | 213.5          | 57.2          | 281        | 271.4          | 79.7     |
| 42       | 40.6         |              | 102      |                | 26.4                | 162        | 156.5          | 41.9         | 222        | 214.4          | 57.5          | 282        | 272.4          |          |
| 43       | 41.5         |              | 103      |                | 26.7                | 163        | 157.4          | 42.2         | 223        | 215.4          | 57.7          | 283        | 273.4          |          |
| 44       | 42.5         |              | 104      | 100.5          |                     |            | 158.4          | 42.4         | 224        | 216.4          | 58.0          | 284        | 274.3          |          |
| 45       | 43.5         |              | 105      | 101.4          |                     | 165        | 159.4          | 42.7         | 225        | 217.9          | 58.2          | 285        | 275.3          |          |
| 46       | 44.4         |              | 106      | 102.4          |                     | 166        | 160.3          | 43.0         |            | 218.3          | 58.5          |            | 276.3          |          |
| 47<br>48 | 45.4         |              | 107      | 103.4          |                     | 167        | 161.3          | 43.2         | 927        | 219.3          | 58.8          | 287        | 277.2          |          |
| 49       | 46.4<br>47.3 |              | 108      | 104.3<br>105.3 |                     | 168        | 162.3<br>163.2 | 43.5         | 228        | 220.2<br>221.2 | 59.0          | 288<br>289 | 278.2<br>279.2 |          |
| 50       | 48.3         |              | 110      | 106.3          |                     | 169<br>170 | 164.2          | 43.7<br>44.0 | 229<br>230 | 221.2          | 59.3<br>59.5  | 290        | 280.1          |          |
|          |              |              |          |                | <u> </u>            |            |                |              | i          |                | !             | <b></b>    |                |          |
| 51<br>52 | 49.3         | 13.2<br>13.5 |          | 107.2<br>108.2 |                     |            | 165.2          |              |            | 223.1 $224.1$  | 59.8          | 291<br>292 | 281.1<br>282.1 |          |
| 53       | 51.2         |              |          | 108.2          |                     | 172        | 166.1<br>167.1 | 44.5<br>44.8 |            | 224.1          | 60.0<br>60.3  |            | 283.0          |          |
| 54       | 52.2         |              |          | 110.1          |                     | 174        | 168.1          | 45.0         |            | 226.0          | 60.6          | 293        | 284.0          |          |
| 55       | 53.1         |              | 115      | 111.1          |                     | 175        | 169.0          | 45.3         | 235        | 227.0          | 60.8          | 295        | 284.9          |          |
| 56       | 54.1         |              |          | 112.0          |                     | 176        | 170.0          |              |            | 228.0          | 61.1          | 296        | 285.9          |          |
| 57       | 55.1         | 14.8         | 117      | 113.0          | 30.3                | 177        | 171.0          | 45.8         |            | 228.9          | 61.3          |            | 286.9          | 76.9     |
| 58       | 56.0         |              |          | 114.0          |                     | 178        | 171.9          | 46.1         | 238        | 229.9          | 61.6          | 298        | 287.8          |          |
| 59       | 57.0         |              |          | 114.9          |                     | 179        | 172.9          | 46.3         |            | 230.9          | 61.9          |            | 288.8          |          |
| 60       | 58.0         | '            |          | 115.9          |                     | 180        | 173.9          |              | 240        | 231.8          | 62.1          |            | 289.8          |          |
| Dist.    | Dep.         | D. Ļat       | Dist.    | Dep.           | Dlat                | Dist.      | Dep.           | D.Lat        | Dist.      | Dep.           | D.Lat         | Dist.      | Dep.           | D.Lat    |

| -:        |              | <u> </u> |          |                |                     |              | Degre            |                | . 01               | THE QUAL                 | KAM        | <del></del>              |
|-----------|--------------|----------|----------|----------------|---------------------|--------------|------------------|----------------|--------------------|--------------------------|------------|--------------------------|
| Dist.     | D.Lat        | Den.     | l Dist.  | D.Lat          | Den                 | I Diet       | Degre            | Don            | Diet               | D.LatiDep.               | i Dia      | DI ati Dan               |
|           |              |          |          |                |                     |              |                  | Dep.           | Dist.              |                          | Dist.      | DLat Dep.                |
| 1 2       | 1.0          | 0.3      | 61       | 58.6           |                     | 121          | 116.3            | 38.4           | 181                | 174.0 49.9               | 241        | 231.7,66.4               |
| 3         | 1.9<br>2.9   | 0.6      | 62       | 59.6           | 17.1                |              | 117.3            | 33.6           |                    | 174.950.2                | 242        | 232.666.7                |
| 4         | 3.8          | 1.1      | 63<br>64 | 60.6           | 17.4<br>17.6        |              | 118.2            | 33.9           |                    | 175.950.4                |            | 233.6 67.0               |
| 5         | 4.8          | 1.4      | 65       | 62.5           |                     | 124<br>125   | $119.2 \\ 120.2$ | 34.2           | 184                | 176.950.7                | 244        |                          |
| 6         | 5.8          | 1.7      | 66       | 63.4           |                     |              | 121.1            | $34.5 \\ 34.7$ |                    | 177.851.0<br>178.851.3   | 245<br>246 | 235.5 67.5               |
| 7         | 6.7          | 1.9      | 67       | 64.4           | 18.5                | 127          | 122.1            | 35.0           | 187                | 179.8 51.5               | 247        | 236.5 67.8<br>237.4 68.1 |
| 8         | 7.7          | 2.2      | 68       | 65.4           | 18.7                | 128          | 123.0            | 35.8           | 188                | 180.751.8                | 248        | 288.4 68.4               |
| 9         | 8.7          | 2.5      | 69       | 66.3           | 19.0                | 129          | 124.0            | 35.6           |                    | 181.7 52.1               |            | 239.468.6                |
| 10        | 9.6          | 2.8      | 70       | 67.3           | 19.3                | 130          | 125.0            | 35.8           | 190                | 182.6 52.4               | 250        | 240.368.9                |
| 11        | 10.6         | 3.0      | 71       | 68.2           | 19.6                | 131          | 125.9            | 36.1           | 101                | 183.6 52.6               | 051        |                          |
| 12        | 11.5         | 3.3      | 72       | 69.2           | 19.8                | 132          | 126.9            | 36.4           | 191<br>192         | 184.6 52.9               | 251        | 241.3 69.2<br>242.2 69.5 |
| 13        | 12.5         | 3.6      | 73       | 70.2           | 20.1                | 133          | 127.8            | 36.7           | 193                | 185.553.2                |            | 243.269.7                |
| 14        | 13.5         | 3 9      | 74       | 71.1           | 20.4                | 134          | 128.8            | 36.9           |                    | 186.5 53.5               |            | 244.270.0                |
| 15        | 14.4         | 4.1      | 75       | 72.1           | 20.7                |              | 129.8            | 37.2           |                    | 187.453.7                |            | 245.1 70.3               |
| 16        | 15.4         | 4.4      | 76       | 73.1           | 20.9                | 136          | 130.7            | 37.5           | 196                | 188.454.0                | 256        | 246.1 70.6               |
| 17        | 16.3         | 4.7      | 77       | 74.0           | 21.2                | 137          | 131.7            | 37.8           |                    | 189.4 54.3               | 257        | 247.0 70.8               |
| 18        | 17.3         | 5.0      | 78       | 75.0           | 21.5                |              | 132.7            | 38.0           |                    | 190.3 54.6               | 258        | 248.0 71.1               |
| 19        | 18.9         | 5.2      | 79       | 75.9           | 21.8                | 139          | 133.6            |                | 199                | 191.3 54.9               | 259        | 249.071.4                |
| 20        | 19.2         | 5.5      | 80       | 76.9           | 22.1                | 140          | 134.6            | 38.6           | 200                | 192.3 55.1               | 260        | 249.971.7                |
| 21        | 20.2         | 5.8      | 81       | 77.9           | 22.3                | 141          | 135.5            | 38.9           | 201                | 193.2 55.4               | 261        | 250.971.9                |
| 22        | 21.1         | 6.1      | 82       | 78.8           | 22.6                |              | 136.5            | 39.1           | 202                | 194.2 55.7               | 262        | 251.972.2                |
| 23        | 22.1         | 6.3      | 83       | 79.8           | 22.9                | 143          | 137.5            | 39.4           |                    | 195.1 56.0               | 263        | 252.8 72.5               |
| 24        | 23.1         | 6.6      | 84       | 80.7           | 23.2                | 144          | 138.4            | 39.7           | 204                | 196.1 56.2               | 264        | 253.8 72.8               |
| 25        | 24.0         | 6.9      | 85       | 81.7           | 23.4                |              | 139.4            | 40.0           | 205                | 197.1 56.5               | 265        | 254.7 73.0               |
| 26<br>27  | 25.0         | 7.2      | 86<br>87 | 82.7           | 23.7                |              | 140.3            | 40.2           |                    | 198.0 56.8               | 266        |                          |
| 28        | 26.0<br>26.9 | 7.4      | 88       | 83.6<br>84.6   | 24.0<br>24.3        |              | 141.3            | 40.5           | 207                | 199.057.1                | 267        | 256.7 73.6               |
| 29        | 27.9         | 8.0      | 89       | 85.6           |                     | 148<br>149   | 142:3<br>143.2   | 40.8           | 208                | 199.9 57.3               | i .        | 257.6 73.9               |
| 30        | 28.8         | 8.3      | 90       | 86.5           | 24.8                |              | 144.2            | 41.3           | 209<br>210         | 200.9 57.6<br>201.9 57.9 | 269<br>270 | 258.6 74.1               |
|           |              |          | <u> </u> |                |                     | <del> </del> |                  | -11.5          | 210                | 201.3                    | 270        | 259.5 74.4               |
| 31        | 29.8         | 8.5      | 91       | 87.5           | 25.1                | 151          | 145.2            | 41.6           | 211                | 202.8 58.2               | 271        | 260.5 74.7               |
| 32<br>33  | 30.8         | 8.8      | 92       | 88.4           | 25.4                | 152          | 146.1            | 41.9           | 212                | 203.8 58.4               | 272        | 261.5 75.0               |
| 34        | 31.7<br>32.7 | 9.1      | 93<br>94 | 89.4<br>90.4   | 25.6                | 1            | 147.1            | 42.2           | 213                | 204.758.7                | 273        | 262.4 75.2               |
| 35        | 33.6         |          | 95       | 91.3           | $\frac{25.9}{26.2}$ | 154<br>155   | 148.0            | 42.4           | 214                | 205.7 59.0               | 274        | 263.4 75.5               |
| 36        | 34.6         |          | 96       | 92.3           | 26.5                |              | 149.0<br>150.0   | 42.7           | 21 <i>5</i><br>216 | 206.7 59.3<br>207.6 59.5 | 275        | 264.3 75.8               |
| 37        | 35.6         |          | 97       | 93.2           | 26.7                | 157          | 150.9            | 43.3           | 217                | 208.659.8                | 276<br>277 | 265.3 76.1<br>266.3 76.4 |
| 38        | 36.5         |          | 98       | 94.2           | 27.0                | 158          | 151.9            | 43.6           | 218                | 209.660.1                | 278        | 267.2 76.6               |
| 39        | 37.5         | 10.7     | 99       | 95.2           | 27.3                | 159          | 152.8            | 43.8           | 219                | 210.560.4                | 279        | 268.2 76.9               |
| 40        | 38.5         | 11.0     | 100      | 96.1           | 27.6                | 160          | 153.8            | 44.1           | 220                | 211.560.6                | 280        | 269.2 77.2               |
| 41        | 39.4         | 11.3     | 101      | 97.1           | 27.8                | 161          | 154.8            |                |                    |                          |            |                          |
| 42        | 40.4         |          | 102      | 98.0           | 28.1                |              | 155.7            | 44.4           | 221<br>222         | 212.460.9<br>213.461.2   | 281        | 270.1 77.5               |
| 43        | 41.3         |          | 103      | 99.0           |                     | 163          | 156.7            | 44.9           | 223                | 214.461.5                | 282<br>283 | 271.177.7<br>272.078.0   |
| 44        | 42.3         |          | 104      | 100.0          | 28.7                | 164          | 157.6            | 45.2           | 224                | 215.361.7                | 284        | 273.0 78.3               |
| 45        | 43.3         |          | 105      | 100.9          | 28.9                | 165          | 158.6            | 45.5           | 225                | 216.362.0                | 285        | 274.0 78.6               |
| 46        | 44.2         |          | 106      | 101.9          | 29.2                | 166          | 159.6            | 45.8           |                    | 217.262.3                | 286        | 274.9 78.8               |
| 47        | 45.2         |          | 107      | 102.9          | 29.5                | 167          | 160.5            | 46.0           | 227                | 218.262.6                | 287        | 275.9 79.1               |
| 48        | 46.1         |          | 108      | 103.8          | 29.8                | 168          | 161.5            | 46 3           | 228                | 219.2 62.8               | 288        | 276.8 79.4               |
| 49<br>50  | 47.1<br>48.1 |          | 109      | 104.8          | 30.0                | 169          | 162.5            | 46.6           | 229                | 220.163.1                | 289        | 277.8 79.7               |
| 30        |              | \        | 110      | 105.7          | 30.3                | 170          | 163.4            | 46.9           | 230                | 221.1 63.4               | 290        | 278.8 79.9               |
| 51        | 49.0         |          | 111      | 106.7          | 30.6                | 171          | 164.4            | 47.1           | 231                | 222.163.7                | 291        | 279.7 80.2               |
| 52        | 50.0         | 14.3     |          | 107.7          | 30.9                | 172          | 165.3            | 47.4           | 232                | 223.063.9                |            | 280.7 80.5               |
| 53        | 50.9         |          |          | 108.6          |                     | 173          | 166.3            | 47.7           | 233                | 224.064.2                | 293        | 281.680.8                |
| 54        | 51.9         |          |          | 109.6          | 31.4                |              | 167.3            | 48.0           | 234                | 224.964.5                | 294        | 282.681.0                |
| 55<br>56  | 52.9         |          |          | 110.5          | 31.7                |              | 168.2            | 48.2           | 235                | 225.964.8                | 295        | 283.681.3                |
| 50<br>57  | 53.8<br>54.8 |          |          | 111.5          | 32.0                |              | 169.2            | 48.5           | 236                | 226.965.1                | 296        | 284.581.6                |
| <b>58</b> | 55.8         |          | 118      | 112.5<br>113.4 | 32.5                | 177<br>178   | 170.1<br>171.1   | 48.8           | 237                | 227.865.3                | 297        | 285.581.9                |
| 59        | 56.7         |          | 119      | 114.4          | 32.8                |              | 172.1            | 49.1<br>49.3   | 238<br>239         | 228.8 65.6<br>229.7 65.9 | 298<br>299 | 286.582.1                |
| 60        | 57.7         |          | 120      | 115.4          | 83.1                |              | 173.0            |                | 240                | 230.7 66.2               | 300        | 287.482.4<br>288.482.7   |
| No.       | Dep.         |          |          |                |                     |              |                  |                |                    | P                        |            |                          |
|           | reb.         | v.vat    | Dist.    | . neb.         | D. Lat              |              |                  |                | Dist.              | Dep Dlati                | Dist.      | Dep. D. Lat              |
| -         | •            |          |          |                |                     | - 74         | Degre            | es.            |                    |                          |            |                          |

| 1   1.0   0.3   61   68.3   17.8   121   115.7   35.4   181   173.1   52.5   241   290.5   70     2   1.9   0.6   62   59.3   18.1   122   116.7   35.7   182   174.0   53.2   242   291.4   71     3   2.9   0.9   63   60.2   18.4   123   116.7   35.7   182   174.0   53.2   244   291.4   71     4   3.8   1.2   64   61.2   18.7   124   118.6   66.9   184   176.0   53.8   248   392.4   71     5   4.8   1.5   65   69.2   19.0   125   119.5   36.5   184   176.0   53.8   244   293.5   71     6   5.7   1.8   66   63.1   19.3   126   120.5   36.8   186   177.9   54.4   245   234.3   71     7   6.7   2.0   67   64.1   19.6   127   121.5   37.1   187   178.8   54.7   247   236.3   71     8   7.7   2.3   68   65.0   19.9   128   122.4   37.4   188   179.8   55.0   248   237.2   72     9   8.6   2.6   69   66.0   20.2   129   123.4   37.7   189   180.7   55.6   249   238.1   72     10   9.6   2.9   70   66.9   20.5   130   124.3   38.0   190   18.7   55.6   250   239.1   73     11   10.5   3.2   71   67.9   20.8   131   125.3   38.3   191   182.7   55.8   251   240.0   73     12   11.5   3.5   72   68.9   21.1   133   127.2   38.6   192   183.6   56.1   252   241.0   73     13   12.4   3.8   73   69.8   21.4   133   127.2   38.9   193   184.6   56.7   255   244.8   74     15   14.5   4.4   75   71.7   71.9   135   129.1   39.5   195   186.5   57.0   255   244.8   74     16   15.3   4.7   76   72.7   22.9   136   130.1   39.8   196   187.4   67.5   255   244.8   74     17   16.3   5.0   77   73.6   22.5   137   131.0   40.1   197   188.4   57.6   257   244.8   74     17   16.3   5.0   77   73.6   22.5   137   131.0   40.1   197   188.4   57.6   257   244.8   74     17   16.3   5.0   77   73.6   22.5   137   131.0   40.1   197   188.4   57.6   257   244.8   74     17   18.3   5.6   79   75.5   23.1   139   132.9   40.6   199   190.3   38.2   259   247.7   75     25   23.9   7.3   85   81.3   24.9   145   138.7   42.4   20.5   190.0   60.5   266   244.8   74     25   25   25.8   7.9   87   88   88   88   88   68   69.5   269   |            |         |          |           |                       | 17 Deg | rees. |       |       |       |       |       |              |
|--|------------|---------|----------|-----------|-----------------------|--------|-------|-------|-------|-------|-------|-------|--------------|
| 2  | Dist. D.L. | at Dep. | Dist.    | D.Lat Dep | Dist.                 | D.L.at | Dep.  | Dist. | DLat  | Dep.  | Dist. | D.Lat | Dep.         |
| 8   2.9   0.9   63   60.2   18.4   128   117.6   36.0   188   175.0   33.5   948   293.4   71     4   3.8   1.2   64   61.2   18.7   124   118.6   36.0   183   175.0   33.5   948   293.4   71     5   4.8   1.5   65   69.2   19.0   125   119.5   36.5   185   176.9   54.1   245   294.3   71     6   5.7   1.8   66   63.1   19.3   126   120.5   36.8   186   177.9   54.1   245   294.3   71     7   6.7   2.0   67   64.1   19.6   127   121.5   77.1   187   178.8   54.7   247   256.9   72     8   7.7   2.3   68   65.0   19.9   128   122.4   37.4   188   179.8   55.0   248   237.2   72     9   8.6   2.6   69   66.0   20.2   129   123.4   37.7   189   180.7   55.5   249   238.1   72     10   9.6   2.9   70   66.9   20.5   130   124.3   38.0   190   181.7   55.6   250   239.1   73     11   10.5   3.2   71   67.9   20.8   131   125.3   38.3   191   182.7   55.8   251   240.0   73     12   11.5   3.5   72   68.9   21.1   132   126.2   38.6   192   183.6   65.4   252   241.0   74     13   12.4   3.8   73   69.8   21.1   132   126.2   38.6   192   183.6   65.4   252   241.9   74     14   13.4   4.1   74   70.8   21.6   134   128.1   39.2   194   185.5   56.7   255   241.9   74     15   14.3   4.4   75   71.7   21.9   135   129.1   39.5   195   186.5   57.0   255   244.9   74     16   15.3   4.7   76   72.7   22.2   136   130.1   39.8   196   187.4   57.5   256   244.8   74     17   16.3   5.0   77   73.6   22.5   137   131.0   40.1   197   188.4   57.6   257   245.8   241   24   |            |         |          |           |                       | 1      |       |       |       |       |       | 230.5 | 70.5         |
| 4   3.8   1.2   64   61.9   18.7   124   118.6   36.9   184   176.0   53.8   244   233.3   71     5   4.8   1.5   65   62.2   19.0   125   119.5   36.5   185   176.9   534.1   245   234.3   71     6   5.7   1.8   66   63.1   19.3   126   120.5   36.5   186   177.9   54.4   245   235.3   71     7   6.7   2.0   67   64.1   19.6   127   121.5   37.1   181   178.8   54.7   247   236.9   72     8   7.7   2.3   68   65.0   19.9   128   129.4   37.4   188   179.8   55.4   249   238.1   72     9   8.6   2.6   69   66.0   20.2   129   123.4   37.7   189   180.7   55.5   249   238.1   72     10   9.6   2.9   70   66.9   20.5   130   124.3   38.0   190   181.7   55.6   250   239.1   73     11   10.5   3.5   71   67.9   20.8   131   125.3   38.3   191   182.7   55.8   251   240.0   73     13   12.4   3.8   73   69.8   21.3   133   127.2   38.9   193   184.6   56.1   252   241.0   73     13   12.4   3.8   73   69.8   21.3   133   127.2   38.9   193   184.6   56.4   252   241.0   73     14   15.4   4.1   74   70.8   21.6   134   128.1   392.9   194   185.5   56.7   254   242.9   74     15   14.3   4.4   75   71.7   21.9   135   129.1   39.8   193   184.6   56.4   252   241.0   73     17   16.3   5.0   77   73.6   22.5   137   131.0   40.1   197   188.4   57.6   255   244.8   74     17   16.3   5.0   77   73.6   22.5   137   131.0   40.1   197   188.4   57.6   256   244.8   74     19   18.2   5.6   79   75.5   23.1   139   139.9   40.6   199   190.3   58.2   259   247.7   75     19   18.2   5.6   79   75.5   23.1   139   139.9   40.6   199   190.3   58.2   259   247.7   75     20   19.1   5.8   80   76.5   23.4   140   133.9   40.9   200   191.3   58.5   250   248.6   76     21   20.1   6.1   81   77.5   23.7   141   134.8   41.2   201   192.2   58.8   261   249.6   76     22   21.0   6.4   82   78.4   24.0   142   155.8   41.5   202   193.2   59.1   262   250.6   76     23   22.0   6.7   83   79.4   24.1   24.1   24.1   24.1   24.1   24.1   24.1   24.1   24.1   24.1   24.1   24.1   24.1   24.1   24.1   24.1   24.1   24.1     |            |         | 13       |           | . 11                  | 1      |       |       |       |       | 1 .   |       | 70.8         |
| 5  | 1          | - 1     |          |           |                       |        |       |       |       |       |       |       | 71.0         |
| 6   5.7   1.8   66   63.1   19.3   196   120.5   36.8   166   177.9   54.4   246   235.3   71   77   67.7   2.3   68   65.0   19.9   128   122.4   37.4   188   179.8   55.5   248   237.2   72   9   8.6   2.6   69   66.0   20.2   129   123.4   37.7   189   180.7   55.5   249   238.1   72   72   72   72   72   72   72   7  |            |         |          |           |                       |        |       |       |       |       |       |       | 71.3<br>71.6 |
| 8         7.7         2.3         68         65.0         19.9         128         122.4         37.4         188         17.9         8 55.0         248         237.2         72           9         8.6         2.6         69         66.0         20.2         129         123.4         37.7         189         180.7         55.5         249         238.1         72           10         9.6         2.9         70         66.9         20.5         130         124.3         38.0         190         181.7         35.6         250         239.1         73           11         10.5         3.2         71         67.9         20.8         131         125.3         38.3         191         182.7         35.8         251         240.0         73           13         12.4         3.8         73         69.8         21.3         133         127.2         38.9         193         184.6         56.4         252         241.0         73           14         13.4         4.1         74         70.8         21.3         133         127.2         38.5         195         186.5         57.5         254         242.9         74 </th <th></th> <th>71.9</th>   |            |         |          |           |                       |        |       |       |       |       |       |       | 71.9         |
| 8  |            |         |          |           |                       |        |       |       |       |       |       |       | 72.2         |
| 10   |            |         |          | 65.0 19.  | 9 128                 |        | 37.4  |       |       | 55.C  | 248   |       | 72.5         |
| 11   |            |         |          |           |                       |        |       |       |       |       |       |       | 72.8         |
| 12   | 10 9.      | 6 2.9   | 70       | 66.920.   | 5 130                 | 124.3  | 38.0  | 190   | 181.7 | 55.6  | 250   | 239.1 | 73.1         |
| 13   |            |         | 71       | 67.9 20.  | 8 131                 | 125.3  | 38.3  | 191   |       | 55.8  | 251   | 240.0 | 73.4         |
| 14       13.4       4.1       74       70.8       21.6       134       128.1       39.2       194       185.5       56.7       254       242.9       74         15       14.3       4.4       75       71.7       21.9       135       129.1       39.5       195       186.5       57.0       255       248.9       74         17       16.3       5.0       77       73.6       22.5       137       131.0       40.1       197       188.4       57.6       257       244.8       74         18       17.2       5.3       78       74.6       92.8       138       192.0       40.3       198       189.3       57.9       258       244.8       74         19       18.2       5.6       79       75.5       23.1       139       132.9       40.9       190.3       58.2       259       247.7       75         20       19.1       5.8       80       76.5       23.7       141       134.8       41.2       201       192.2       58.8       261       249.6       76         21       20.1       6.1       81       77.5       23.7       141       134.8       41.2 <th></th> <th>73.7</th>  |            |         |          |           |                       |        |       |       |       |       |       |       | 73.7         |
| 15   |            | 4       |          |           |                       |        |       |       |       |       |       |       | 74.0         |
| 16       15.3       4.7       76       72.7       22.2       136       130.1       39.8       196       187.4       57.5       256       244.8       74         17       16.3       5.0       77       73.6       22.5       137       131.0       40.1       197       188.4       57.6       227       245.8       75         19       18.2       5.6       79       75.5       23.1       139       132.9       40.6       199       190.3       58.2       259       247.7       75         20       19.1       5.8       80       76.5       23.7       141       134.8       41.2       201       192.2       58.8       260       248.6       76         21       20.1       6.4       82       78.4       24.0       142       185.8       41.5       202       199.2       58.8       261       249.6       76         23       22.0       6.7       83       79.4       24.3       143       186.8       41.8       203       194.1       59.4       262       250.6       76         24       23.0       7.0       84       80.3       22.5       144.1       187.7 </th <th></th> <th>1</th> <th></th> <th>74.3</th>   |            | 1       |          |           |                       |        |       |       |       |       |       |       | 74.3         |
| 17   |            |         |          |           |                       |        |       |       |       |       |       |       | 74.6<br>74.8 |
| 18   |            | 1       |          |           |                       |        |       |       |       |       |       |       | 75.1         |
| 20   |            |         | 78       |           |                       | 132.0  |       | 1     |       |       |       |       | 75.4         |
| 21 20.1 6.1 81 77.5 23.7 141 134.8 41.2 201 192.2 58.8 261 249.6 76 22 21.0 6.4 82 78.4 24.0 142 155.8 41.5 202 193.2 59.1 262 250.6 76 23 22.0 6.7 83 79.4 24.3 143 136.8 41.8 203 194.1 59.4 263 251.5 76 24 23.0 7.0 84 80.3 24.6 144 137.7 42.1 204 195.1 59.6 264 252.5 77 25 23.9 7.3 85 81.3 24.9 145 138.7 42.4 205 196.0 59.9 265 253.4 77 26 24.9 7.6 86 82.2 25.1 146 139.6 42.7 206 197.0 60.2 266 254.4 77 27 25.8 7.9 87 83.2 25.4 147 140.6 43.0 207 198.0 60.5 267 255.3 78 28 26.8 8.2 88 84.2 25.7 148 141.5 43.3 208 198.9 60.8 268 256.3 78 29 27.7 8.5 89 85.1 26.0 149 142.5 43.6 209 199.9 61.1 269 257.2 78 30 28.7 8.8 90 86.1 26.3 150 143.4 43.9 210 200.8 61.4 270 258.2 78 31 29.6 9.1 91 87.0 26.6 151 144.4 44.1 211 201.8 61.7 271 259.2 79 32 30.6 9.4 92 88.0 26.9 152 145.4 44.4 212 202.7 62.0 272 260.1 79 33 31.6 9.6 93 88.9 27.2 153 146.3 44.7 213 203.7 62.3 273 261.1 79 34 32.5 9.9 94 89.9 27.5 154 147.3 45.0 214 205.6 62.6 274 262.0 80 36 34.4 10.5 96 91.8 28.1 156 149.2 45.6 216 206.6 63.2 276 263.9 80 36 34.4 10.5 96 91.8 28.1 156 149.2 45.6 216 206.6 63.2 276 263.9 80 37 35.4 10.8 97 92.8 28.4 157 150.1 45.9 217 207.5 63.4 277 264.9 81 38 36.3 11.1 98 93.7 28.7 158 151.1 46.2 218 208.5 66.2 275 275 263.0 80 37 35.4 10.8 97 92.8 28.4 157 150.1 45.9 217 207.5 63.4 277 264.9 81 39 37.3 11.4 99 94.7 28.9 159 152.1 46.2 212 202.7 62.0 272 260.1 79 38 37.3 11.4 99 94.7 28.9 159 152.1 46.2 219 209.4 64.0 279 268 81 40 38.3 11.7 100 95.6 29.2 160 153.0 46.8 220 210.4 64.3 280 267.8 81 41 39.2 12.0 101 96.6 29.5 161 154.0 47.1 221 211.3 64.6 281 268.7 82 42 40.2 12.3 102 97.5 29.8 162 154.9 47.4 222 212.3 64.9 282 269.7 82 43 41.1 12.6 103 98.5 30.1 163 155.9 47.7 223 213.3 65.5 283 270.6 82 44 42.1 12.9 104 99.5 30.4 164 156.8 47.9 224 214.2 65.5 268. 284 271.6 82 44 42.1 12.9 104 99.5 30.4 164 156.8 47.9 224 214.2 65.5 265.8 285 272.5 83 46 44.0 13.4 106 101.4 31.0 166 158.7 48.5 226 216.1 66.1 286 273.5 83   |            |         |          |           |                       |        |       |       |       |       | 1     |       | 75.7         |
| 22         21.0         6.4         82         78.4         24.0         142         135.8         41.5         202         193.2         59.1         262         250.6         76           23         22.0         6.7         83         79.4         24.3         143         156.8         41.8         203         194.1         59.4         263         251.5         76           24         23.0         7.0         84         80.3         24.6         144         137.7         42.1         204         195.1         59.6         264         252.5         77           25         23.9         7.3         85         81.3         24.9         145         188.7         42.4         205         196.0         59.9         265         253.4         477           26         24.9         7.6         86         82.2         25.1         146         139.6         42.7         206         197.0         60.2         266         254.4         47           27         25.8         7.9         87         83.2         225.7         148         141.5         43.3         208         198.0         60.5         266         255.3         78  | 20 19.     | 5.8     | 80       | 76.5 23.  | 140                   | 133.9  | 40.9  | 200   | 191.8 | 58.5  | 260   | 248.6 | 76.0         |
| 22   |            |         |          | 77.5 23.  | 7 141                 | 134.8  | 41.2  | 201   | 192.2 | 58.8  | 261   | 249.6 | 76.3         |
| 24         23.0         7.0         84         80.3         24.6         144         137.7         42.1         204         195.1         59.6         264         252.5         77           25         23.9         7.3         85         81.3         24.9         145         188.7         42.4         205         196.0         59.9         265         253.4         77           26         24.9         7.6         86         82.2         25.1         146         139.6         42.7         206         197.0         60.2         266         254.4         77           27         25.8         7.9         87         83.2         25.4         147         140.6         43.0         207         198.0         60.5         267         255.3         78           28         26.8         8.2         88         84.2         225.7         148         141.5         48.3         208         158.9         60.8         268         266.3         27.2         78           30         22.7         8.5         89         85.1         26.0         149         142.5         43.6         209         199.9         61.1         269         257.2   |            |         |          | 78.424.   | 0 142                 |        | 41.5  | 202   |       |       | 262   | 250.6 | 76.6         |
| 25         23.9         7.3         85         81.8 24.9         145         138.7         42.4         205         196.0         59.9         265         233.4         77           26         24.9         7.6         86         82.2 25.1         146         139.6         42.7         206         197.0         60.2         266         234.4         77           27         25.8         7.9         87         83.2         25.4         147         140.6         43.0         207         198.9         60.5         267         255.3         78           28         26.8         8.2         88         84.2 25.7         148         141.5         43.3         208         188.9         60.8         268         256.3         78           30         28.7         8.8         90         86.1         26.3         150         143.4         43.9         210         200.8         61.1         269         257.2         78           31         29.6         9.1         91         87.0 26.6         151         144.4         44.1         211         201.8         61.7         271         259.2         79           32         30.6         <  |            |         |          |           |                       |        |       |       |       |       |       |       | 76.9         |
| 26         24.9         7.6         86         82.2         25.1         146         139.6         42.7         206         197.0         60.2         266         254.4         77           27         25.8         7.9         87         83.2         25.4         147         140.6         43.0         207         198.0         60.5         267         255.3         78           28         26.8         8.2         88         84.2         25.7         148         141.5         43.3         208         198.9         60.8         268         256.3         78           30         28.7         8.8         90         86.1         26.0         149         142.5         43.6         209         199.9         61.1         269         297.2         78           31         29.6         9.1         91         87.0         26.6         151         144.4         44.1         211         201.8         61.7         271         259.2         79           32         30.6         9.4         92         88.0         26.9         152         145.4         44.4         212         202.7         62.0         272         260.1         79  |            |         |          |           |                       | 1      |       | 1     |       |       |       |       | 77.2         |
| 27         25.8         7.9         87         83.2         25.4         147         140.6         43.0         207         198.0         60.5         267         255.3         78           28         26.8         8.2         88         84.2         25.7         148         141.5         43.3         208         198.9         60.8         268         256.3         78           30         28.7         8.8         90         86.1         126.3         150         143.4         48.9         210         200.8         61.1         269         257.2         78           31         29.6         9.1         91         87.0         26.6         151         144.4         44.1         211         201.8         61.7         271         259.2         79           32         30.6         9.4         92         88.0         26.9         152         145.4         44.4         212         200.7         62.0         272         2260.1         79           33         31.6         9.6         93         88.9         27.2         153         146.3         44.7         213         203.7         62.3         273         261.1         79  |            |         |          |           |                       |        |       |       |       |       |       |       | 77.5<br>77.8 |
| 28         26.8         8.2         88         84.2 25.7         148         141.5         48.5         208         198.9         60.8         268         226.3         78           29         27.7         8.5         89         85.1 26.0         149         142.5         43.6         209         199.9         61.1         269         257.2         78           30         28.7         8.8         90         86.1 26.3         150         143.4         43.9         210         200.8         61.1         269         257.2         78           31         29.6         9.1         91         87.0 26.6         151         144.4         44.1         211         201.8         61.7         271         259.2         79           32         30.6         9.4         92         88.0 26.9         152         145.4         44.4         212         202.7         62.0         272         260.1         79           34         32.5         9.9         94         89.9 27.2         153         146.3         44.7         213         203.7         62.0         272         263.0         80           35         33.5         10.2         95  |            |         |          |           |                       | 1      |       |       |       |       |       |       | 78.1         |
| 29         27.7         8.5         89         85.1   26.0           149   142.5           43.6           209   199.9           61.1           269   257.2           78           30         28.7           8.8           90         86.1   26.3           150   143.4           43.9           210   200.8           61.4           270   258.2           78           31         29.6           9.1           91           87.0   26.6           151   144.4           44.1           211   201.8           61.7           271   259.2           79           32         30.6           9.4           92           88.0   27.2   153           146.3           44.7           212   202.7           62.0           272   260.1           79           34         32.5           9.9           94           89.9   27.2   153           146.3           44.7           213   203.7           62.0           273   261.1           79           34         32.5           9.9           94           89.9   27.5           154   147.3           45.0           214   204.6           62.0   272   263.0           80           35         33.5   10.2           95           90.8   27.8   155           148.2   45.3   215   205.6   62.9           275   263.0           80           36  |            |         |          |           |                       |        |       |       |       |       |       |       | 78.4         |
| 31         29.6         9.1         91         87.0 26.6         151         144.4         44.1         211         201.8         61.7         271         259.2         79           32         30.6         9.4         92         88.0 26.9         152         145.4         44.4         212         202.7         62.0         272         2260.1         79           33         31.6         9.6         93         88.9 27.2         153         146.3         44.7         213         203.7         62.3         273         261.1         79           34         32.5         9.9         94         89.9 27.8         155         148.2         45.3         215         205.6         62.9         275         263.0         80           35         33.5         10.2         95         90.8 27.8         155         148.2         45.3         215         205.6         62.9         275         263.0         80           36         34.4         10.5         96         91.8 28.1         156         149.2         45.6         216         205.6         63.2         276         263.9         80           37         35.4         10.8         97 <th></th> <th></th> <th></th> <th>85.1 26.</th> <th>0 149</th> <th></th> <th>43.6</th> <th>209</th> <th>199.9</th> <th>61.1</th> <th>269</th> <th></th> <th>78.6</th>   |            |         |          | 85.1 26.  | 0 149                 |        | 43.6  | 209   | 199.9 | 61.1  | 269   |       | 78.6         |
| 32         30.6         9.4         92         88.0         26.9         152         145.4         44.4         212         202.7         62.0         272         260.1         79           33         31.6         9.6         93         88.9         27.2         153         146.3         44.7         213         203.7         62.0         272         260.1         79           34         32.5         9.9         94         89.9         27.5         154         147.3         45.0         214         204.6         62.6         274         262.0         80           35         33.5         10.2         95         90.8         27.8         155         148.2         245.8         215         205.6         62.9         275         263.0         80           36         34.4         10.5         96         91.8         28.1         156         149.2         45.6         216         205.6         63.2         276         263.9         80           37         35.4         10.8         97         92.8         28.1         150.1         45.9         217         207.5         63.4         277         266.9         81  | 30 28.     | 7 8.8   | 90       | 86.1 26.  | 3 150                 | 143.4  | 43.9  | 210   | 200.8 | 61.4  | 270   | 258.2 | 78.9         |
| 32         30.6         9.4         92         88.0   26.9           152         145.4           44.4           212         202.7           62.0           272           260.1           79           33         31.6   9.6           93         88.9   27.2           153           146.3           44.7           213           203.7           62.0           272           260.1           79           34         32.5           9.9           94           89.9           27.5           154           147.3           45.0           214           204.6           62.0           274           262.0           80           35         33.5           10.2           95           90.8           27.8           155           148.2           45.5           215           205.6           62.9           275           265.0           80           36         34.4           10.5           96           91.8           80.1           156           149.2           45.6           216           206.6           63.2           276           263.9           80           37         35.4           10.8           97           92.8           151           140.2           217           207.5           63.4           277  | 31 29.     | 6 9.1   | 91       | 87.0 26.  | 6 151                 | 144.4  | 44.1  | 211   | 201.8 | 61.7  | 271   | 259.2 | 79.2         |
| 34         32.5         9.9         94         89.9         27.5         154         147.3         45.0         214         204.6         62.6         274         262.0         80           35         33.5         10.2         95         90.8         27.8         155         148.2         45.3         215         205.6         62.9         275         263.0         80           36         34.4         10.5         96         91.8         28.1         156         149.2         45.6         216         206.6         62.9         275         263.0         80           37         35.4         10.8         97         92.8         28.4         157         150.1         45.9         217         207.5         63.2         276         264.9         81           38         36.3         11.1         98         93.7         28.7         158         151.1         46.2         218         208.5         63.7         278         265.9         81           39         37.3         11.4         99         94.7         28.9         159         152.1         46.5         219         209.4         64.0         279         266.8         81 <th></th> <th></th> <th></th> <th></th> <th></th> <th>145.4</th> <th>44.4</th> <th>212</th> <th>202.7</th> <th>62.0</th> <th>272</th> <th></th> <th>79.5</th>   |            |         |          |           |                       | 145.4  | 44.4  | 212   | 202.7 | 62.0  | 272   |       | 79.5         |
| 35         33.5         10.2         95         90.8         27.8         155         148.2         45.3         215         205.6         62.9         275         263.0         80           36         34.4         10.5         96         91.8         28.1         156         149.2         45.6         216         206.6         63.2         276         263.9         80           37         35.4         10.8         97         92.8         28.4         157         150.1         45.9         217         207.6         63.2         277         264.9         80           38.         36.3         11.1         98         99.7         28.7         158         151.1         46.9         218         208.5         63.7         278         265.9         81           40         38.3         11.7         100         95.6         29.2         160         153.0         46.8         220         210.4         64.0         281         266.8         81           41         39.2         12.0         101         96.6         29.5         161         154.0         47.1         221         21.3         64.6         281         268.7         82  |            |         |          |           |                       |        |       | 11    |       |       |       |       | 79.8         |
| 36         34.4         10.5         96         91.8         28.1         156         149.2         45.6         216         206.6         63.2         276         263.9         80           37         35.4         10.8         97         92.8         28.4         157         150.1         45.9         217         207.5         63.4         277         264.9         81           38.3         31.1         98         93.7         28.7         158         151.1         46.2         218         208.5         68.7         278         265.9         81           40         38.3         11.7         100         95.6         29.2         160         153.0         46.8         220         210.4         64.0         279         266.7         81           41         39.2         12.0         101         96.6         29.5         161         154.0         47.1         221         211.3         64.6         281         266.7         81           42         40.2         12.3         102         97.5         29.8         162         154.0         47.1         221         211.3         64.6         281         266.7         82  |            |         |          |           |                       |        |       |       |       |       |       |       | 80.1         |
| 37     35.4     10.8     97     92.8     28.4     157     150.1     45.9     217     207.5     63.4     277     264.9     81       38     36.3     11.1     98     93.7     28.7     158     151.1     46.2     218     208.5     68.7     278     265.9     81       39     37.3     11.4     99     94.7     28.9     159     152.1     46.5     219     209.4     64.0     279     266.8     81       40     38.3     11.7     100     95.6     29.2     160     153.0     46.8     220     210.4     64.3     280     267.8     81       41     39.2     112.0     101     96.6     29.5     161     154.0     47.1     221     211.3     64.6     281     268.7     82       42     40.2     12.3     102     97.5     29.8     162     154.9     47.4     222     212.3     64.9     282     269.7     82       43     41.1     12.6     103     98.5     39.1     163     155.9     47.7     223     213.3     65.2     283     270.6     82       44     42.1     12.9     104     99  |            |         |          |           |                       | 1.     | 1     | 14    |       |       |       |       | 80.4<br>80.7 |
| 38.     36.3 11.1     98     93.7 28.7     158     151.1     46.2     218     208.5     68.7     278     265.9     81       39     37.3 11.4     99     94.7 28.9     159     152.1     46.5     219     209.4     64.0     279     266.8     81       40     38.3 11.7     100     95.6 29.2     160     153.0     46.8     220     210.4     64.3     280     267.8     81       41     39.2 12.0     101     96.6 29.5     161     154.0     47.1     221     211.3     64.6     281     268.7     82       42     40.2 12.3     102     97.5 29.8     162     154.9     47.4     222     212.3     64.9     282     260.7     82       43     41.1 12.6     103     98.5 30.1     163     155.9     47.7     222     213.3     65.2     283     270.6     82       44     42.1 12.9     104     99.5 30.4     164     156.8     47.9     224     214.2     65.5     284     271.6     83       45     43.0 13.2     105     100.4 30.7     165     157.8     48.2     225     215.2     65.8     235     972.5     83       <  |            |         |          |           |                       |        |       |       |       |       |       |       | 81.0         |
| 40         88.3   11.7   100         95.6   29.2   160   153.0   46.8   220   210.4   64.3   280   267.8   81           41         39.2   12.0   101   96.6   29.5   161   154.0   47.1   221   211.3   64.6   281   268.7   82           42         40.2   12.3   102   97.5   29.8   162   154.9   47.4   222   212.3   64.9   282   269.7   82           43         41.1   12.6   103   98.5   30.1   163   155.9   47.7   223   213.3   65.2   283   270.6   82           44         42.1   12.9   104   99.5   30.4   164   156.8   47.9   224   214.2   65.5   284   271.6   82           45         43.0   13.2   105   100.4   30.7   165   157.8   48.5   225   215.2   65.8   235   272.5   83           46         44.0   13.4   106   101.4   31.0   166   158.7   48.5   226   216.1   66.1   286   273.5   83  |            |         | 98       |           |                       |        |       |       |       |       |       |       | 81.3         |
| 41     39.2 12.0     101     96.6 29.5     161     154.0     47.1     221     211.3     64.6     281     268.7     82       42     40.2 12.3     102     97.5 29.8     162     154.9     47.4     222     212.3     64.9     282     269.7     82       43     41.112.6     103     98.5 30.1     163     155.9     47.7     223     213.3     65.2     283     270.6     82       44     42.1 12.9     104     99.5 30.4     164     156.8     47.9     224     214.2     65.5     284     271.6     83       45     43.0 13.2     105     100.4 30.7     165     157.8     48.2     225     215.2     65.8     285     972.5     83       46     44.0 13.4     106     101.4 31.0     166     158.7     48.5     226     216.1     66.1     286     273.5     83   |            |         | 11       |           |                       |        |       |       |       |       | 11    | 266.8 | 81.6         |
| 42     40.2 12.3     102     97.5 29.8     162     154.9     47.4     222     212.3     64.9     282     269.7     82       43     41.1 12.6     103     98.5 99.1     163     155.9     47.7     223     213.3     65.2     283     270.6     82       44     42.1 12.9     104     99.5 30.4     164     156.8     47.9     224     214.2     65.5     284     271.6     82       45     43.0 13.2     105     100.4 30.7     165     157.8     48.5     225     215.2     65.8     285     272.5     83       46     44.0 13.4     106     101.4 31.0     166     158.7     48.5     226     216.1     66.1     286     273.5     83  | 40 38.     | 311.7   | 100      | 95.629.   | 2 160                 | 153.0  | 46.8  | 220   | 210.4 | 64.3  | 280   | 267.8 | 81.9         |
| 42     40.2 12.3     102     97.5 29.8      162     154.9      47.4      222     212.3     64.9      282     269.7      82       43     41.1 12.6      103     98.5 90.1      163     155.9      47.7      223     213.3      65.2      283     270.6      82       44     42.1 12.9      104     99.5 90.4      164     156.8      47.9      224     214.2      65.5      284     271.6      83       45     43.0 13.2      105     100.4 30.7      165     157.8 48.2      225     215.2 65.8      285     272.5 83       46     44.0 13.4      106     101.4 31.0      166     158.7 48.5      226     216.1 66.1      66.1      286     273.5 83   |            |         |          |           |                       |        | 47.1  | 221   | 211.8 | 64.6  | 281   | 268.7 | 82.2         |
| 44     42.1     12.9     104     99.5     30.4     164     156.8     47.9     224     214.2     65.5     284     271.6     83       45     43.0     18.2     105     100.4     30.7     165     157.8     48.2     225     215.2     65.8     285     272.5     83       46     44.0     13.4     106     101.4     31.0     166     158.7     48.5     226     216.1     66.1     286     273.5     83  |            |         |          |           |                       |        |       |       |       |       |       | 269.7 | 82.4         |
| 45 43.0 13.2 105 100.4 30.7 165 157.8 45.2 225 215.2 65.8 285 272.5 83<br>46 44.0 13.4 106 101.4 31.0 166 158.7 48.5 226 216.1 66.1 286 273.5 83   |            |         |          |           |                       |        |       |       |       |       |       |       | 82.7         |
| <b>46 44.0 13.4 106 101.4 31.0 166 158.7 48.5 226 216.1 66.1 286 273.5 83</b>  |            |         |          |           |                       |        |       |       |       |       | 1     |       | 83.0         |
|  |            |         |          |           |                       |        |       |       |       |       |       |       | 83.5         |
| 1  | 47 44.     | 9 13.7  | 107      |           |                       | 159.7  | 48.8  | 227   | 217.1 | 66.4  | 287   | 274.5 | 83.9         |
| <b>48</b>   <b>45</b> .9   <b>14</b> .0   108   103.3   31.6   168   160.7   49.1   228   218.0   66.7   288   275.4   84  |            |         |          | 103.3 31. | 6 168                 | 160.7  |       |       |       |       |       |       | 84.2         |
|  |            | - 1     |          |           |                       | 1.     |       |       |       |       |       |       | 84.5         |
|  |            | '       | ·        | 105.2 32. | 170                   | 162.6  | 49.7  | 230   | 220.0 | 67.2  | 290   | 277.3 | 84.8         |
| 51 48.8 14.9 111 106.1 82.5 171 163.5 50.0 231 220.9 67.5 291 278.3 85   |            |         | 41       |           |                       |        |       |       | 220.9 | 67.5  |       |       | 85.1         |
|  |            |         |          |           |                       |        |       |       | 221.9 |       |       |       |              |
| 54 F1 G1F O   714 1100 C   715 |            |         |          |           |                       |        |       |       |       |       |       |       |              |
| E 100 010 1 110 0100 0100 0100 0100 010  |            |         |          |           |                       |        |       |       |       |       |       |       | 86.0         |
| 56 59 616 4 116 116 666 61 176 166 61 7  |            |         |          |           |                       |        |       |       |       |       |       |       | 86.2<br>86.5 |
| 57 54.5 16.7 117 111.9 34.2 177 169.3 51.7 287 226.6 69.3 297 284.C 86   | 57 54.     | 5 16.7  |          |           |                       |        |       |       |       |       |       |       | 86.8         |
| 58   55.5 17.0    118   112.8 34.5   178   170.2  52.0   288   227.6  69.6   298   285.0  87   |            |         |          | 112.8 34. | 5 178                 | 170.2  |       | 288   | 227.6 | 69.6  | 298   |       | 87.1         |
|  |            |         |          |           |                       |        |       | 289   |       |       |       |       | 87.4         |
|  |            |         | H        | Jf        | _!!                   |        |       | P     | 1     |       | 11    |       | 87.7         |
| Dist. Dep. D.Lat Dist. Dep. D.lat Dist. Dep. D.Lat Dist. Dep. D.Lat Dist. Dep. D.L   | Dist.i Dep | D. DLat | ll Dist. | Dep. DJa  | t <sup>( </sup> Dist. | Dep.   | D.Lat | Dist. | Dep.  | D.Lat | Dist. | Dep.  | D.Lat        |

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|            |              |            |            |                |       | 1          | 8 Deg          | rees.        |            |                |              |            |                |      |
|------------|--------------|------------|------------|----------------|-------|------------|----------------|--------------|------------|----------------|--------------|------------|----------------|------|
| Dist.      | D.Lat        | Dep.       | Dist.      | D.Lat          | Dep.  | Dist.      | D.Lat          | Dep.         | Dist.      | D.Lat          | Dep.         | Dist.      | DLat           | Dep. |
| 1          | 1.0          | 0.3        | 61         | 58.0           | 18.9  | 121        | 115.1          | 37.4         | 181        | 172.1          | 55:9         | 241        | 229.2          | 74.5 |
| 2          | 1.9          | 0.6        | 62         |                | 19.2  | 122        | 116.0          | 37.7         | 182        | 173.1          | 56.2         | 242        | 230.2          |      |
| 3          | 2.9          |            | 63         | 59.9           |       | 123        | 117.0          |              | 183        | 174.0          | 56.6         | 243        | 231.1          |      |
| 4          | 3.8          |            | 64         | 60.9           |       | 124        | 117.9          |              | 184        | 175.0          | 56.9         | 244        | 232.1          |      |
| . 5<br>6   | 4.8<br>5.7   | 1.5        | 65<br>66   | 61.8<br>62.8   |       | 125<br>126 | 118.9<br>119.8 |              | 185        | 175.9<br>176.9 | 57.2<br>57.5 | 245<br>246 | 233.0<br>234.0 |      |
| 7          | 6.7          |            | 67         | 63.7           |       | 127        | 120.8          | 39.2         | 187        | 177.8          | 57.8         | 247        | 234.9          |      |
| 8          | 7.6          |            | 68         | 64.7           |       | 128        | 121.7          | 39.6         | 188        | 178.8          | 58.1         | 248        | 235.9          |      |
| 9          | 8.6          |            | 69         | 65.6           | 21.3  | 129        | 122.7          | 39.9         | 189        | 179.7          | 58.4         | 249        | 236.8          |      |
| 10         | 9.5          | 3.1        | 70         | 66.6           | 21.6  | 130        | 123.6          | 40.2         | 190        | 180.7          | 58.7         | 250        | 237.8          | 77.3 |
| 11         | 10.5         | 3.4        | 71         | 67.5           | 21.9  | 131        | 124.6          | 40.5         | 191        | 181.7          | 59.0         | 251        | 238.7          | 77.6 |
| 12         | 11.4         | 3.7        | 72         | 68.5           | 22.2  | 132        | 125.5          | 40.8         | 192        | 182.6          | 59.3         | 252        | 239.7          |      |
| 13         | 12.4         |            | 73         | 69.4           |       | 133        | 126.5          | 41.1         | 193        | 183.6          | 59.6         | 253        | 240.6          |      |
| 14         | 13.3         |            | 74         | 70.4           |       | 134        | 127.4          | 41.4         | 194        | 184.5          | 59.9         | 254        | 241.6          |      |
| 15<br>16   | 14.3<br>15.2 | 4.6<br>4.9 | 75<br>76   | 71.3<br>72.3   |       | 135<br>136 | 128.4<br>129.3 | 41.7<br>42.0 | 195<br>196 | 185.5<br>186.4 | 60.3<br>60.6 | 255<br>256 | 242.5<br>243.5 |      |
| 17         | 16.2         |            | 77         | 73.2           |       | 137        | 130.3          | 42.3         | 190        | 187.4          | 60.9         | 257        | 244.4          |      |
| 18         | 17.1         | 5.6        | 78         | 74.2           |       | 138        | 131.2          |              | 198        | 188.3          | 61.2         | 258        | 245.4          |      |
| 19         | 18.1         | 5.9        | 79         | 75.1           |       | 139        | 132.2          | 43.0         | 199        | 189.3          | 61.5         | 259        | 246.3          |      |
| 20         | 19.0         | 6.2        | 80         | 76.1           | 24.7  | 140        | 183.1          | 43.3         | 200        | 190.2          | 61.8         | 260        | 247.3          | 80.3 |
| 21         | 20.0         | 6.5        | 81         | 77.0           | 25.0  | 141        | 134.1          | 43.6         | 201        | 191.2          | 62.1         | 261        | 248.2          | 80.7 |
| 22         | 20.9         | 6.8        | 82         | 78.0           |       | 142        | 135.1          | 43.9         | 202        | 192.1          | 62.4         | 262        | 249.2          |      |
| 23         | 21.9         | 7.1        | ·83        | 78.9           |       | 143        | 136.0          | 44.2         | 203        | 193.1          | 62.7         | 263        | 250.1          |      |
| 24         | 22.8         | 7.4        | 84         | 79.9           |       | 144        | 137.0          |              | 204        | 194.0          | 63.0         | 264        | 251.1          |      |
| 25         | 23.8         | 7.7        | 85         | 80.8           |       | 145        | 137.9          | 44.8         | 205        | 195.0          | 63.3         | 265        | 252.0          |      |
| 26<br>27   | 24.7<br>25.7 | 8.0        | 86         | 81.8           |       | 146        | 138.9          | 45.1<br>45.4 | 206        | 195.9          | 63.7         | 266        | 253.0          |      |
| 28         | 26.6         | 8.3        | 87<br>88   | 82.7<br>83.7   |       | 147<br>148 | 139.8<br>140.8 | 45.7         | 207<br>208 | 196.9<br>197.8 | 64.0<br>64.3 | 267<br>268 | 253.9<br>254.9 |      |
| 29         | 27.6         | 9.0        | 89         | 84.6           |       | 149        | 141.7          | 46.0         | 209        | 193.8          | 64.6         | 269        | 255.8          |      |
| 30         | 28.5         | 9.3        | 90         | 85.6           |       |            | 142.7          | 46.4         | 210        | 199.7          | 64.9         | 270        | 256.8          |      |
| 31         | 29.5         | 9.6        | 91         | 86.5           | 98 1  | 151        | 143.6          | 46.7         | 211        | 200.7          | 65.2         | 271        | 257.7          | 89 7 |
| 32         | 30.4         | 9.9        | 92         | 87.5           |       | 152        | 144.6          | 47.0         | 212        | 201.6          | 65.5         | 272        | 258.7          |      |
| 33         | 31.4         |            | 93         | 88.4           |       |            | 145.5          | 47.3         | 213        | 202.6          | 65.8         | 273        | 259.6          |      |
| 34         | 32.3         |            | 94         | 89.4           | 29.0  | 154        | 146.5          | 47.6         | 214        | 203.5          | 66.1         | 274        | 260.6          |      |
| 35         | 33.3         |            | 95         | 90.4           |       | 155        | 147.4          | 47.9         | 215        | 204.5          | 66.4         | 275        | 261.5          |      |
| <b>3</b> 6 | 34.2         |            | 96         | 91.3           |       | 156        | 148.4          | 48.2         | 216        | 205.4          | 66.7         | .276       | 262.5          |      |
| 38         | 35.2<br>36.1 |            | 97<br>98   | 92.3<br>93.2   |       | 157<br>158 | 149.3<br>150.3 | 48.5         | 217<br>218 | 206.4<br>207.3 | 67.1<br>67.4 | 277<br>278 | 263.4<br>264.4 |      |
| 39         | 37.1         |            | 99         | 94.2           |       | 159        | 151.2          | 49.1         | 219        | 208.3          | 67.7         | 279        | 265.3          |      |
| 40         | 38.0         |            | 100        | 95.1           |       | 160        | 152.2          | 49.4         | 220        | 209.2          | 68.0         | 280        | 266.3          |      |
| 41         | 39.0         | 19.7       | 101        | 96.1           | 21 0  | 161        | 153.1          | 49.8         | 221        | 210.2          | 68.3         | 001        | 267.2          | 00 0 |
| 42         | 39.9         |            | 101        | 97.0           |       |            | 154.1          | 50.1         | 221        | 210.2          | 68.6         | 281<br>282 | 268.2          |      |
| 43         | 40.9         |            | 103        | 98.0           |       | 163        | 155.0          | 50.4         | 223        | 212.1          | 68.9         | 283        | 269.1          |      |
| 44         | 41.8         | 13.6       | 104        | 98.9           |       |            | 156.0          | 50.7         | 224        | 213.0          | 69.2         | 284        | 270.1          | 87.8 |
| 45         | 42.8         |            | 105        | 99.9           |       |            | 156.9          | 51.0         | 225        | 214.0          | 69.5         | 285        | 271.1          |      |
| 46<br>47   | 43.7         |            | 106        | 100.8          |       | 166        | 157.9          | 51.3         | 226        | 214.9          | 69.8         | 286        | 272.0          |      |
| 48         | 44.7         |            | 107<br>108 | 101.8<br>102.7 |       | 167<br>168 | 158.8<br>159.8 | 51.6<br>51.9 | 227<br>228 | 215.9 $216.8$  | 70.1         | 287<br>288 | 273.0<br>273.9 |      |
| 49         | 46.6         |            | 109        | 103.7          |       |            | 160.7          | 52.2         | 229        | 217.8          | 70.8         | 289        | 274.9          |      |
| 50         | 47.6         |            | 110        | 104.6          |       |            | 161.7          | 52.5         | 230        | 218.7          | 71.1         |            | 275.8          |      |
| 51         | 48.5         |            | 111        | 105.6          | 24 0  | 171        | 162.6          | 52.8         | 231        | 219.7          | 71.4         |            | 276.8          | 80.0 |
| 52         | 49.5         |            |            | 106.5          |       |            | 163.6          | 53.2         | •          | 220.6          | 71.7         |            | 270.8<br>277.7 |      |
| 53         | 50.4         |            | 1          | 107.5          |       |            | 164.5          |              | •          | 221.6          | 72.0         |            | 278.7          |      |
| 54         | 51.4         |            |            | 108.4          | 35.2  |            | 165.5          | 58.8         |            | 222.5          | 72.3         | 294        | 279.6          | 90.9 |
| 55         | 52.3         | 17.0       | 115        | 109.4          | 35.5  | 175        | 166.4          | 54.1         | 235        | 223.5          | 72.6         | 295        | 280.6          | 91.2 |
| 56         | 53.3         |            |            | 110.3          |       |            | 167.4          | 54.4         |            | 224.4          | 72.9         |            | 281.5          |      |
| 57         | 54.2         |            | 117        | 111.3          |       |            | 168.3          | 54.7         | 237        | 225.4          | 73.2         | 297        | 282.5          |      |
| 58<br>59   | 55.2<br>56.1 |            | 118<br>119 | 112.2<br>113.2 |       |            | 169.3<br>170.2 | 55.0         | 238<br>239 | 226.4<br>227.3 | 73.5<br>73.9 | 298<br>299 | 283.4<br>284.4 |      |
| 60         | 57.1         |            | 120        | 114.1          |       |            | 170.2          | 55.8<br>55.6 |            | 228.3          | 74.2         |            | 285.3          |      |
|            |              |            |            |                |       |            |                |              |            |                |              |            | <del> </del> } |      |
| Dist.      | Dep. 1       | D.Lat      | Dist.      | Dep.           | DJati | Dist.      | Dep.           | D.Lat        | Dist.      | Dep.           | D.Lat        | Dist.      | Dep.           | DLat |
|            |              |            |            |                |       | 7          | 2 Deg          | rees.        |            | -              |              |            |                |      |
|            |              |            |            |                |       |            |                |              |            |                |              |            |                |      |

|            |               |                   |            |                |              |              | Degre          |              |            | ~_~                              |           |   |     |
|------------|---------------|-------------------|------------|----------------|--------------|--------------|----------------|--------------|------------|----------------------------------|-----------|---|-----|
| Dist.      | D.Lat         | Dep.              | Dist.      | D.Lat          | Dep.         | Dist.        | DLat           | Dep.         | Dist.      | D.Lat D                          | ep. Dist. | D. at D   | ep. |
| 1          | 0.9           | 0.3               | 61         | 57.7           | 19.9         |              | 114.4          |              |            | 171.158                          |           | 227.9 78  |     |
| 2          | 19            | 0.7               | 62         | 58.6           | 20.2         |              | 115.4          |              | 182        | 172.159                          |           | 228.8 78  |     |
| 4          | 2.8<br>3.8    | 1.0               | 64         | 59.6<br>60.5   | 20.5<br>20.8 |              | 116.3<br>117.2 | 40.0<br>40.4 | 183<br>184 | 173.0 59<br>174.0 59             |           | 229.879<br>230.779                                |     |
| 5          | 4.7           | 1.6               | 65         | 61.5           | 1 1          |              | 118.2          | 40.7         | 185        | 174.9 60                         |           | 231.779   |     |
| 6          | 5.7           | 2.0               | 66         | 62.4           |              | 126          | 119.1          | 41.0         | 186        | 175.9 60                         |           | 232.6 80  |     |
| 8          | 6.6<br>7.6    | 2.3               | 67         | 63.3           | 21.8         | 127<br>128   | 120.1<br>121.0 | 41.3         | 187<br>188 | 176.8 60                         |           | 233.580   |     |
| 9          | 8.5           | 2.9               | 69         | 65.2           | 22.1         | 128          | 122.0          | 42.0         |            | 177.8 61<br>178.7 61             |           | 234.580<br>235.481                                |     |
| 10         | 9.5           | 3.3               | 70         | 66.2           | 22.8         |              | 122.9          | 42.3         |            | 179.661                          |           | 236.481   |     |
| 11         | 10.4          | 3.6               | 7,1        | 67.1           | 23.1         | 131          | 123.9          | 42.6         | 191        | 180.662                          | .2 251    | 237.381   | .7  |
| 12         | 11.3          | 3.9               | 72         | 68.1           | 23.4         | 132          | 124.8          | 49.0         | 192        | 181.5 62                         | .5 252    | 238.3 82  |     |
| 13         | 12.3          | 4.2               | 73         | 69.0           | 23.8         |              | 125.8          | 48.3         | 193        | 182.5 62                         |           | 239.282   |     |
| 14<br>15   | 13.2<br>14.2  | 4.6               | 74         | 70.0           | 24.1 $24.4$  | 134<br>135   | 126.7          | 43.6<br>44.0 | 194<br>195 | 183.463<br>184.463               |           | 240.282<br>241.183                                |     |
| 16         | 15.1          | 5.2               | 7 <i>G</i> | 71.9           | 24.7         | 136          | 128.6          | 44.3         | 196        | 185.8 63                         |           | 242.183   | -   |
| 17         | 16.1          | 5.5               | 77         | 72.8           | 25.1         | 137          | 129.5          | 44.6         | 197        | 186.3 64                         |           | 243.083   |     |
| 18<br>19   | 17.0<br>18.0  | $\frac{5.9}{6.2}$ | 78<br>79   | 73.8           | 25.4         | 138          | 130.5          | 44.9         | 198<br>199 | 187.264                          |           | 243.984   |     |
| 20         | 18.9          | 6.5               | 80         | 74.7<br>75.6   | 25.7<br>26.0 |              | 131.4          | 45.8         | 200        | 188.2 64<br>189.1 65             |           | 244.984<br>245.884                                |     |
| 21         | 19.9          | 6.8               | 81         |                |              |              |                |              |            |                                  |           | <u> </u>  |     |
| 22         | 20.8          | 7.2               | 82         | 76.6<br>77.5   | 26.4<br>26.7 | 141<br>142   | 133.3<br>134.3 | 45.9<br>46.2 | 201<br>202 | 190.0 65<br>191.0 65             |           | 246.8 85<br>247.7 85                              |     |
| 23         | 21.7          | 7.5               | 83         | 78.5           | 27.0         | 143          | 135.2          | 46.6         | 203        | 191.966                          |           | 248.785   |     |
| 24         | 22.7          | 7.8               | 84         | 79.4           | 27.3         | •            | 136.2          | 46.9         | 204        | 192.9 66                         |           | 249.686   |     |
| 25<br>26   | 23.6<br>24.6  | 8.1               | 85<br>86   | 80.4<br>81.3   | 27.7<br>28.0 | 145<br>146   | 137.1<br>138.0 | 47.2<br>47.5 | 205<br>206 | 193.8 66<br>194.8 67             |           | 250.686.<br>251.586.                              |     |
| 27         | 25.5          | 8.8               | 87         | 82.3           | 28.3         | 147          | 139.0          | 47.9         | 207        | 195.7 67                         |           | 252.586   |     |
| 28         | 26.5          | 9.1               | 88         | 83.2           | 28.7         | 148          | 139.9          | 48.2         | 208        | 196.7 67                         | .7 268    | 253.487.  | .3  |
| 29<br>30   | 27.4          | 9.4               | 89         | 84.2           | 29.0         | 149          | 140.9          | 48.5         | 209        | 197.6 68                         |           | 254.3 87.   |     |
| l[         | 28.4          | 9.8               | 90         | 85.1           | 29.3         |              | 141.8          | 48.8         | 210        | 198.6 68                         | _         | 255.3 87.   |     |
| 31<br>32   | 29.3          |                   | 91         | 86.0           | 29.6         | 151          | 142.8          | 49.2         | 211        | 199.5 68                         |           | 256.2,88.   |     |
| 32         | 30.3<br>\$1.2 |                   | 92<br>93   | 87.0<br>87.9   | 30.0<br>30.3 | 1.52<br>1.53 | 143.7          | 49.5         |            | 200.4 69<br>201.4 69             |           | 257.288.<br>258.188.                              |     |
| 34         | 32.1          |                   | 94         | 88.9           | 30.6         |              |                |              |            | 202.3 69                         |           | 259.189.  |     |
| <b>3</b> 5 | 33.1          |                   | 95         | 89.8           | 30.9         |              | 146.6          |              |            | 203.3 70                         |           | 260.089.  |     |
| 36<br>37   | 34.0<br>35.0  |                   | 96<br>97   | 90.8<br>91.7   | 31.6         |              | 147.5          | 50.8<br>51.1 |            | 204.2 70<br>205.2 70             |           | 261.089.<br>261.990.                              |     |
| 38         | 35.9          |                   | 98         | 92.7           | 31.9         | 158          | 149.4          | 51.4         |            | 206.171                          |           | 262.9 90.   |     |
| 39         | 36.9          |                   | 99         | 93.6           | 32.2         | 159          | 150.3          | 51.8         |            | 207.171                          |           | 268.8 90.   |     |
| 40         | 37.8          | 13.0              | 100        | 94.6           | 32.6         | 160          | 151.3          | 52.1         | 220        | 208.0 71                         | .6 280    | 264.7 91.   | .2  |
| 41         | 38.8          |                   | 101        | 95.5           | 32.9         | 161          | 152.2          | 52.4         |            | 209.072                          |           | 265.791.  |     |
| 42<br>43   | 39.7<br>40.7  |                   | 102        | 96.4<br>97.4   | 33.2         | 162<br>163   | 153.2<br>154.1 | 52.7         |            | 209.972<br>210.972               |           | 266.6 91.<br>267.6 92.                            |     |
| 44         | 41.6          |                   | 103        | 98.3           | 33.5<br>33.9 | 164          | 155.1          | 53.1<br>53.4 |            | 211.872                          |           | 268.5.92.   |     |
| 45         | 42.5          |                   | 105        | 99.3           | 84.2         | 165          | 156.0          | 53.7         | 225        | 212.7 73                         | .3 285    | 269.5 92.   | . 8 |
| 46<br>47   | 43.5          |                   | 106        | 100.2          | 34.5         | 166          | 157.0          | 54.0         | 226        | 213.773                          |           | 270.4'93.   |     |
| 48         | 44.4<br>45.4  |                   | 107        | 101.2<br>102.1 | 34.8<br>35.2 | 167<br>168   | 157.9<br>158.8 | 54.4<br>54.7 |            | 214.6 73<br>215.6 74             |           | 271.4.93.<br>272.3.98.                            |     |
| 49         | <b>46</b> .3  | 16.0              | 109        | 103.1          | 35.5         | 169          | 159.8          | 55.0         |            | 216.574                          | .6 289    | 273.3 94.   | . 1 |
| 50         | 47.3          | 16.3              | 110        | 104.0          | 35.8         | 170          | 160.7          | 55.8         | 230        | 217.5 74                         | .9 290    | 274.2 94.   | .4  |
| 51         | 48.2          |                   |            | 105.0          |              | 171          | 161.7          | 55.7         | 231        | 218.4 75                         | 2 291     | 275.194.  |     |
| 52         | 49.2          |                   |            | 105.9          |              |              | 162.6          |              | 232        | 219.475                          | .5 292    | 276.1 95.   |     |
| 53<br>54   | 50.1<br>51.1  |                   | 113        | 106.8<br>107.8 | 36.8<br>37.1 | 173<br>174   | 163.6<br>164.5 |              |            | 220.3 75<br>221.3 76             |           | 277.0 95.<br>278.0 95.                            |     |
| 55         | 52.0          |                   | 115        | 108.7          | 37.4         | 175          | 165.5          |              |            | 222.2 76                         | 11'-      | 278.996.  |     |
| 56         | 52.9          |                   | 116        | 109.7          | 37.8         | 176          | 166.4          | 57.3         | 236        | 223.1 76                         | 8 296     | 279.9 96.   |     |
| 57<br>58   | 59.9<br>54.8  |                   |            | 110.6<br>111.6 | 38.1<br>38.4 | 177<br>178   | 167.4<br>168.3 |              |            | 224 . 1   77 .<br>225 . 0   77 . |           | 280.8 <sub> </sub> 96.<br> 281.8 <sub> </sub> 97. |     |
| 59         | 55.8          |                   | 119        | 112.5          | 38.7         | 179          | 169.2          |              |            | 226.0,77                         | 11        | 282.7 97.   |     |
| 60         | 56.7          | 19.5              | 120        | 113.5          |              | 180          | 170.2          |              |            | 226.9 78                         |           | 283.797.  | .7  |
| Dist.      | Dep.          | D.Lat             | Dist.      | Dep.           | DLat         | Dist.        | Dep.           | U.Lat        | Dist.      | Dep. D.1                         | at Dist.  | Dep. D.   | ∟at |

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

20 Degrees. Dist. |D.Lat Dep. | Dist. D.Lat Dep. Dist. D.Lat Dep. Dist. D.Lat Dep. 1 Dist. D.Latl Dep. 226.5 113.7 241 82.4 0.9 0.3 61 57.3 20.9 41.4 170.161.9 41.7 227.4 2 1.9 0.7 62 **58.**3 21.2 122 114.6 182 171.0 62.2 242 82.8 2.8 1.0 3 123 115.6 228.8 83.1 63 59.2 21.5 42.1 183 172.0 62.6 243 42.4 229.3 4 3.8 1.4 4.7 1.7 64 60.1 21.9 124 116.5 184 172.9 62.9 244 88.5 230.2 5 65 61.1 22.2 125 117.5 42.8 185 173.8 63.3 245 83.8 118.4 174.8 63.6 6 5.6 2.1 66 62,0 22.6 126 43.1 246 281.2 84.1 186 7 6.6 2.4 67 63.O 22.9 127 119.3 43.4 187 175.7 64.0 247 232.1 84.5 8 7.5 2.7 63.9 43.8 233.0 84.8 68 23.3 128 120.3 138 176.7 64.3 248 9 8.5 3.1 69 64.8 23.6 121.2 44.1 234.0 85.2 129 189 177.6 64.6 249 23.9 10 9.4 3.4 70 65.8 130 122.2 44.5 190 178.5 65.0 250 234.9 85.5 71 10.3 24.3 123.1 11 3.8 66.7 ЬЗI 44.8 191 179.5 65.3 251 235.9 85.8 11:3 180.465.7 236.8 4.1 72 67.7 24.6 124.0 45.1 252 86.2 12 132 192 125.0 181.4 66.0 13 12.2 4.4 73 25.0 45.5 253 237.7 86.5 68.6 133 193 25.3 14 13.2 4.8 74 69.5 134 125.9 45.8 194 182.3 66.4 254 238.7 86.9 183.2 66.7 14.1 5.1 25.7 15 75 70.5 135 126.9 46.2 195 255 239.6 87.2 15.0 5.5 16.0 5.8 184.2 67.0 87.6 16 76 71.4 26.0 136 127.8 46.5 196 256 240.6 17 77 72.4 26.3 137 128.7 46.9 197 185.1 67.4 257 241.5 87.9 16.9 18 6.2 78 73.3 26.7 129.7 186.167.7 258 242.4 88.2 138 47.2 198 19 17.9 6.5 79 74.2 27.0 130.6 47.5 187.0 68.1 259 243.4 88.6 139 199 20 18.8 6.8 80 75.2 27.4 187.9 68.4 260 244.9 88.9 140 131.6 47.9 200 21 19 7 7.2 81 76.1 27.7 141 132.5 48.2 201 188.9 68.7 261 245.3 89.3 28.0 99 20.7 7.5 262 246.2 82 77.1 133.4 48.6 202 189.8 69.1 89.6 142 48.9 190.8 69.4 23 21.6 7.9 83 78.0 28.4 143 134.4 203 263 247.1 90.0 24 22.6 8.2 84 78.9 28.7 135.8 49.3 204 191.7 69.8 264 248.1 90.3 144 23.5 8.6 85 192.6 70.1 25 79.9 29.1 136.3 265 249.0 145 49.6 205 90.6 24.4 8.9 26 86 80.8 29.4 146 137.2 49.9 206 193.6 70.5 266 250.0 91.0 25.4 27 9.2 87 81.8 29.8 147 138.1 50.3 207 194.5 70.8 267 250.9 91.3 26.3 9.6 27.3 9.9 28 88 82.7 30.1 148 139.1 50.6 208 195.5 71.1 268 251.8 91.7 29 89 83.6 30.4 149 140.0 51.0 209 196.4 71.5 269 252.8 92.0 28.2 10.3 30 90 84.6 30.8 150 141.0 51.3 210 197.3 71.8 270 253.7 92.3 31 29.1 10.6 91 85.5 31.1 198.3 72.2 254.7 151 141.9 51.6 211 271 92.7 142.8 255.6 32 30.1 10.9 92 86.5 31.5 52.0 199.2 72.5 93.0 152 272 212 33 31.0 11.3 93 87 4 31.8 153 143.8 52.3 213 200.272.9 273 256.5 93.4 34 31.9 11.6 94 88.3 32.1 257.5 93.7 154 144.7 52.7 214 201.173.2 274 89.3 82.5 35 32.9 12.0 95 258.4 155 145.7 215 94.1 53.0 202.0,73.5 275 259.4 36 33.8 12.3 96 90.2 32.8 156 146.6 53.4 216 203.073.9 203.974.2 276 94.4 37 94.8 12.7 97 91.2 260.3 33.2 157 147.5 53.7 217 277 94.7 38 33.5 148.5 35.7,13.0 98 92.1 54.0 278 261.2 1.58 218 204.974.6 95.1 39 36.6 13.3 99 93 0 83.9 159 149.4 54.4 219 205.8 74.9 279 262.2 95.4 40 37.6 13.7 100 94.0 34.2 160 150.4 54.7 220 206.775.2 280 263.1 95.8 41 38.5,14.0 101 94.9 34.5 161 151.3 281 264.1 55.1 221 207.775.6 96.1 42 39.5 14.4 102 95.8 34.9 162 152.2 55.4 222 208+675.9 282265.0 96.4 43 40.4 14.7 103 96.8 35.2 163 158.2 55.7 223 209.676.3 283 265.9 96.8 44 41.3 15.0 97.7 35.6 104 266.9 56.1 224 210.576.6 284 164 154.1 97.1 45 42.3 15.4 105 98.7 35.9 155.0 56.4 225 211.4,77.0 285 267.8 97.5 165 46 48.2 15.7 106 99.6 36.3 166 156.0 56.8 226 212.477.3 286 268.8 97.8 47 44.2 16.1 36.6 269.7 107 100.5 57.1 213.377.6 287 167 156.9 227 98,2 48 45.1 16.4 108 101.5 86.9 168 157.9 57.5 228 214.278.0 288 27016 98.5 49 46.0 16.8 109 102.4 37.8 169 158.8 57.8 229 215.2,78.8 289 271.6 98.8 *5*0 47.0 17.1 110 108.4 87.6 58.1 272.5 99.2 170 159.7 230 216.178.7 290 51 47.9.17.4 114 104.3 38.0 171 160.7 58.5 231 217.1 79.0 291 273.5 99.5 **5**Y 48.917.8 112 105.2 38.3 58.8 292 274.4 99.9 172 161.6 232 218.0 79.3 88.6 53 49.8,18.1 118 106.2 59.2 275.3 100.2 173 162.6 233 218.979.7 293 54 50.7 18.5 114 107.1 39.0 174 59.5 234 219.980.0 294 276.9 100.6 163.5 35 51.7,18.8 115 108.1 39.3 175 164.4 59.9 220.8.80.4 295 277.2 100.9 285 278.1 101.2 56 52.6 19.2 116 109.0 39.7 176 165.4 60.2 236 221.8 80.7 296 57 53.6,19.5 222.7,81.1 117 109.9 40.0 177 166.3 60.5 237 297 279.1 101.6 58 54.5 19.8 118 110.9 40.4 178 167.3 60.9 238 223.6 81.4 298 280.0 101.9 *3*9 55.4 20.2 319 111.8 40.7 239 224.6 81.7 281.0 102.3 179 168.2 61.2 299 60 56.420.5 41.0 120 112.8 180 169.1 61.6 240 225.582.1 300 281.9102.6 Dist. | Dep. |D.Lat Dist. Dist. Dep. D.Lat Dep. D.I.at | Dist. Dep. D.Lat Dist. Dep. D.lat! 70 Degrees

TABLE XIII.

### TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT. 21 Degrees.

| 1        |              |       |            |                |              | 21         |                        |              |            |                         |      |            |                |                |
|----------|--------------|-------|------------|----------------|--------------|------------|------------------------|--------------|------------|-------------------------|------|------------|----------------|----------------|
| Diet.    | D.Lat        | Dep.  | Dist.      | D. Lat         | Dep.         | Dist.      | D.Lat                  | Dep.         | Dist.      | D.Lat                   | Dep. | Dist.      | D.Lat          | Dep.           |
| 1        | 0.9          | 0.4   | 61         | 56.9           | 21.9         | 121        | 113.0                  | 43.4         | 181        | 169.0                   | 64.9 | 241        | 225.0          | 86 4           |
| 2        | 19           | 0.7   | 62         | 57.9           | 22.2         | 122        | 113.9                  | 49.7         | 182        | 169.9                   | 65.2 | 242        | 225.9          | 86.7           |
| 3        | 2.8          | 1.1   | 63         | 58.8           | 22.6         | 123        | 114.8                  | 44.1         | 183        | 170.8                   |      | 248        | 296.9          | <b>87.1</b>    |
| 1 4      | 3.7          | 1.4   | 64         | 59.7           | 22.9         | 124        | 115.8                  | 44.4         | 184        | 171.8                   |      | 244        | 227.8          | <b>87.4</b>    |
| 5        | 4.7<br>5.6   | 1.8   | 65<br>66   | 60.7           | 23.3         | 125        | 116.7                  | 44.6         | 185        | 172.7<br>178.6          |      | 245        | 228.7          | \$7.8          |
| 7        | 6.5          | 2.5   | 67         | 61.6<br>62.5   | 23.7<br>24.0 | 126<br>127 | 117.6<br>118.6         | 45.2<br>45.5 | 186<br>187 | 174.6                   |      | 247        | 229.7<br>230.5 | \$8.2<br>\$8.5 |
| 8        | 7.5          | 2.9   | 68         | 63.5           | 24.4         | 128        | 119.5                  | 45.9         | 186        | 175.5                   |      | 248        | 281.5          | 88.9           |
| 9        | 8.4          | 3.2   | 69         | 64.4           | 24.7         | 129        | 120.4                  | 46.2         | 189        | 176.4                   |      | 249        | 292.5          | 89.2           |
| 10       | 9.3          | 3.6   | 70         | 65.4           | 25.1         | 130        | 121.4                  | 46.6         | 190        | 177.4                   | 68.1 | 250        | 233.4          | 89.6           |
| 11       | 10.3         | 3.9   | 71         | 66.3           | 25.4         | 131        | 122.3                  | 46.9         | 191        | 178.3                   | 68 4 | 251        | 234.3          | 90.0           |
| 12       | 11.2         | 4.3   | 72         | 67.2           | 25.8         |            | 123.2                  | 47.3         |            | 179.2                   |      | 252        | 285.3          | 90.3           |
| 13       | 12.1         | 4.7   | 73         | 68.2           | 26.2         |            | 124.2                  | 47 7         | 198        | 180.2                   |      | 253        | 286.2          | 90.7           |
| 14       | 13.1         | 5.0   | 74         | 69.1           | 26.5         | 184        | 125.1                  | 48.0         | 194        | 181.1                   |      | 254        | 237.1          | 91.0           |
| 15       | 14.0         | 5.4   | 75         | 70.0           | 26.9         |            | 126.0                  | 48.4         | 195        | 182.0                   |      | 255        | 238.1          | 91.4           |
| 16       | 14.9         | 5.7   | 76         | 71.0           | 27.2         | 136        | 127.0                  | 48.7         | 196        | 183.0                   |      | 256        | 239.0          | 91.7           |
| 17<br>18 | 15.9<br>16.8 | 6.1   | 77         | 71.9           | 27.6         | 137        | 127.9<br>128.8         | 49.1<br>49.5 | 197<br>198 | 183.9<br>184.8          |      | 267<br>258 | 299.9          | 92.1           |
| 19       | 17.7         | 6.8   | 79         | 72.8<br>73.8   | 28.0<br>28.3 | 138<br>139 | 129.8                  | 49.8         | 199        | 185.8                   |      | 259        | 240.9<br>241.8 | 92.5<br>92.8   |
| 20       | 18.7         | 7.2   | 80         | 74.7           | 28.7         |            | 130.7                  | 50.2         | 200        | 186.7                   |      | 260        | 242.7          | 991.2          |
| 0        |              |       | <b></b>    | <u> !</u>      |              |            | !                      | '            |            |                         |      |            |                |                |
| 21<br>22 | 19.6<br>20.5 | 7.5   | 81<br>82   | 75.6<br>76.6   | 29.0<br>29.4 | 141<br>142 | 131.6<br>1 <b>32.6</b> | 50.5<br>50.9 | 201<br>202 | 187.6<br>188.6          |      | 261<br>262 | 248.7<br>244.6 | 93.5           |
| 23       | 21.5         | 8.2   | 83         | 77.5           | 29.7         | 143        | 133.5                  | 51.2         | 203        | 189.5                   |      | 263        | 245.5          | 93.9<br>94.3   |
| 24       | 22.4         | 8.6   | 84         | 78.4           | 90.1         |            | 134.4                  | 51.6         | 204        | 190.5                   |      | 264        | 246.5          | 94.6           |
| 25       | 23.3         | 9.0   | 85         | 79.4           | 30.5         | 145        | 135.4                  | 52.0         | 205        | 191.4                   |      | 265        | 247.4          | 95.0           |
| 26       | 24.3         | 9.3   | 86         | 80.3           | 30.8         |            | 136.3                  | 52.3         | 206        | 192.9                   |      | 266        | 248.3          | 95.8           |
| 27       | 25.2         | 9.7   | 87         | 81.2           | 91.2         |            | 137.2                  | 52.7         | 207        | 193.3                   |      | 267        | 249.3          | 95.7           |
| 28       | 26.1         |       | 88         | 82.2           | 31.5         |            | 138.2                  | 63.0         | 208        | 194.2                   |      | 268        | 250.2          | 96.0           |
| 29<br>30 | 27.1<br>28.0 |       | 89<br>90   | 83.1<br>84.0   | \$1.9        |            | 189.1<br>140.0         | 59.4<br>59.8 | 209<br>210 | 195.1                   |      | 269<br>270 | 251.1<br>252.1 | 96.4           |
|          |              |       |            | '              | 32.8         |            | <u> </u>               |              |            |                         |      |            |                | 96.8           |
| 31       | <b>-28.9</b> |       | 91         | 85.0           | 32.6         | 151        | 141.0                  | 54.1         | 211        | 197.0                   |      | 271        | 253.0          | 97.1           |
| 32       | 29.9         |       | 92         | 85.9           | 33.0         | 159        | 141.9                  | 54.5         |            | 197.9                   |      | 272        | 253.9          | 97.5           |
| 33<br>34 | 30.8         |       | 93<br>94   | 86.8           | 33.3<br>33.7 |            | 142.8                  | 54.8<br>55.2 |            | 198.9<br>19 <b>9</b> .8 |      | 273<br>274 | 254.9<br>255.8 | 97.8<br>98.2   |
| 35       | 32.7         |       | . 95       | 88.7           | 34.0         | 155        | 144.7                  | 55.5         |            | 200.7                   |      | 275        | 256.7          | 98.6           |
| 36       | 33.6         |       | 96         | 89.6           | 34.4         | 156        | 145.6                  | 55.9         |            | 201.7                   |      | 276        | 257.7          | 98.9           |
| 37       | 34.5         |       | 97         | 90.6           | 34.8         | 157        | 146.6                  | 56.3         | 217        | 202.6                   | 77.8 | 277        | 258.6          | 99.8           |
| 38       | 35.5         |       | 98         | 91.5           | 35.1         | 158        | 147.5                  | <b>56</b> .6 |            | 203.5                   |      | 278        | 259.5          | 99.6           |
| 39<br>40 | 36.4         |       | 99         | 92.4           | 35.5         | 159        | 148.4                  | 57.0         |            | 204.5                   |      | 279        | 260.5          |                |
| 70       | 37.3         | 14.3  | 100        | 93.4           | 35.8         | 160        | 149.4                  | <b>57.</b> 3 | 220        | 205.4                   | 10.0 | 280        | 261.4          | 100.3          |
| 41       | 38.3         | 14.7  | 101        | 94.8           | 96.2         | 161        | 150.8                  | 57.7         | 221        | <b>306.3</b>            |      | 281        | 262.8          | 100.7          |
| 42       | 39.2         |       | 102        | 95.2           | 36.6         |            | 151.2                  | 58.1         |            | 207.3                   |      | 282        | 268.8          |                |
| 43       | 40.1         |       | 103        | 96.2           | 36.9         |            | 152.2                  | 58.4         |            | 208.2<br>209.1          |      | 283        | 264.2          |                |
| 45       | 41.1         |       | 104<br>105 | 97.1<br>98.0   | 37.3<br>37.6 |            | 153.1<br>154.0         | 58.8<br>59.1 |            | 210.1                   |      | 284<br>285 | 265.1<br>266.1 |                |
| 46       | 42.9         |       | 106        | 99.0           | 38.0         |            | 155.0                  | 59.5         |            | 211.0                   |      | 286        | 267.0          |                |
| 47       | 48.9         |       | 107        | 99.9           | 38.8         |            | 155.9                  | 59.8         |            | 211.9                   |      | 287        | 267.9          |                |
| 48       | 44.8         |       | 108        | 100.8          | 38.7         | 168        | 156.8                  | 60.2         |            | 212.9                   |      | 288        | 268.9          | 103.2          |
| 49       | 45.7         |       | 109        | 101.8          | 39.1         |            | 157.8                  | 60.6         |            | 213.8                   |      | 289        | 269.8          |                |
| .50      | 46.7         | 17.9  | 110        | 102.7          | 39.4         | 170        | 158.7                  | 60.9         | 230        | 214.7                   | 52.4 | 290        | 270.7          | 109.9          |
| 51       | 47.6         | 18.3  | 111        | 103.6          | 39.8         | 171        | 159.6                  | 61.3         | 231        | 215.7                   | 32.8 | 291        | 271.7          | 104.3          |
| 52       | 48.5         | 18.6  |            | 104.6          | 40.1         |            | 160.6                  | 61.6         |            | 216.68                  |      | 292        | 272.6          |                |
| 53       | 49.5         |       |            | 105.5          |              |            | 161.5                  | 62.0         |            | 217.5                   |      |            | 273,5          |                |
| 54       | 50.4         |       |            | 106.4          | 40.9         |            | 162.4                  | 62.4         |            | 218.5                   |      |            | 274.5          |                |
| 55<br>56 | 51.3<br>52.3 |       |            | 107.4          | 41.2<br>41.6 |            | 163.4<br>164.3         | 62.7<br>63.1 |            | 219.4<br>220.5          |      | 295<br>296 | 275.4<br>276.3 |                |
| 57       | 53.2         |       |            | 108.8<br>109.2 | 41.9         |            | 165.2                  | 63.4         |            | 221.3                   |      |            | 277.43         |                |
| 58       | 54.1         |       |            | 110.2          | 42.3         |            | 166.2                  | 63.8         |            | 222.2                   |      | 298        | 278.2          |                |
| 59       | 55.1         |       | 119        | 111.1          | 42.6         |            | 167.1                  | 64.1         | 239        | 223.1                   | 85.6 | 299        | 279.1          | 107.2          |
| 60       | 56.0         |       | 120        | 112.0          | 43.0         |            | 168.0                  | 64.5         | 240        | 224.1                   | 86.0 | 300        | 280.1          | 107.5          |
| Nat.     | Den.         | D.Lat | Diet       | Den            | D. 1 25      | Dist       | Den                    | D.I at       | Diet       | Dep.                    | Diat | Dist       | Den.           | D.Lat          |
|          | ch. h        |       | ~:Bt. [    | meh.           |              |            | Toph!                  | J.Lat        | , 2/186.1  |                         |      |            | P-             |                |

TABLE XIII.

| -                |              |       |             | 1110           | , 1          |            | 1/egre                                 |              | . 01        | THE QUA                | DKAN     | 1.             |                |
|------------------|--------------|-------|-------------|----------------|--------------|------------|--|--------------|-------------|------------------------|----------|----------------|----------------|
| lkt .            | D.J.atl      | Den.  | Dist        | DLat           | Den.         | Diet       | D.l.at                                 | Den 1        | Diet        | D.LatiDei              | II Dies  | D.Lat          | l)en           |
| _                | <b></b>      | إحتد  | <del></del> |                |              |            | اـــــــــــــــــــــــــــــــــــــ |              | <del></del> |                        | ·I'——    | 4              |                |
| 1                | 0.9          | 0.4   | 61          | 56.6           | 22.9         |            | 112.2                                  |              |             | 167.8 67.              |          | 223.5          | 90,3           |
| 2                | 1.9<br>2.8   |       | 62          | 57.5<br>58.4   | 23.2         | 122        | 113.1                                  |              |             | 168.7 68.              |          | 224.4          | 90.7           |
| 4                | 3.7          | 1.5   | 64          | 59.3           | 23.6<br>24.0 | 123<br>124 | 114.0<br>115.0                         |              | 183         | 169.7 68.<br>170.6 68. |          | 225.3<br>226.2 | 91.0<br>91.4   |
| 5                | 4.6          |       | 65          | 60.3           | 24.3         |            | 115.9                                  |              | 184<br>185  | 171.569.               |          | 227.2          | 91.8           |
| 6                | 5.6          | 2.2   | 66          | 61.2           | 24.7         | 1          | 116.8                                  |              |             | 172.5 69.              |          | 228.1          | 92.2           |
| 7                | 6,5          | 2.6   | 67          | 62.1           | 25,1         | 127        | 117.8                                  |              | 187         | 173.4 70.              |          | 229.0          | 92.5           |
| 8                | 7.4          | 3.0   | 68          | 63.0           | 25.5         | 128        | 118.7                                  | 47.9         |             | 174.3 70.              |          | 229.9          | 92.9           |
| 9                | 8.8          | 3.4   | 69          | 64,0           |              | 129        | 119.6                                  |              |             | 175,2 70.              |          | 230.9          | 93.3           |
| 10               | 9.3          | 3.7   | 70          | 64.9           | 26.2         | 130        | 120.5                                  | 48.7         | 190         | 176.2 71.              | 250      | 231.8          | 93.7           |
| 11               | 10.2         | 4.1   | 71          | 65.8           | 26.6         | 131        | 121.5                                  | 49.1         | 191         | 177.171.               | 5 251    | 232.7          | 94.0           |
| 12               | 11.1         | 4.5   | 72          | 66.8           | 27.0         | 132        | 122.4                                  |              | 192         | 178.071.               |          | 233.7          | 94.4           |
| 13               | 12.1         | 4.9   | 73          | 67.7           | 27.3         | 133        | 123,3                                  | 49.8         | 193         | 178.972.               |          | 234.6          | 94.8           |
| 14               | 13.0         | 5.2   | 74          | 68.6           |              | 134        | 124.2                                  | 50.2         |             | 179.972                |          | 235.5          | 95.2           |
| 15<br>16         | 13.9         | 5.6   | 75          | 69.5           | 28.1         | 135        | 125.2                                  | 50.6         |             | 180.8 73.              |          | 236,4          | 95,5           |
| 17               | 14.8<br>15.8 | 6.0   | 76          | 70.5           | 28.5<br>≌⊀,ε | 136        | 126.1                                  | 50.9         | 196         | 181.773.               |          | 237.4          | 95.9<br>96.3   |
| 18               | 16.7         | 6.7   | 78          | 72.3           | 29.2         | 137        | 127.0                                  | 51.3<br>51.7 |             | 182.773.<br>183.674.   |          | 238.3<br>239.2 | 96.6           |
| 19               | 17.6         | 7.1   | 79          | 73.2           |              | 139        | 128.9                                  |              | 199         | 184.5 74.              |          | 240.1          | 97.0           |
| ,20              | 18.5         | 7:5   | 80          | 74.2           | 30.0         | 140        | 129.8                                  |              | 200         | 185.474.               |          | 241.1          |                |
| 21               | 19,5         | 7.9   | 81          | 75.1           | 30.3         | 141        |  | <u></u>      |             | ·                      | -        | 242.0          |                |
| 22               | 20.4         | 8.2   | 82          | 76.0           |              | 142        | 130.7                                  | 52.8<br>53.2 | 201<br>202  | 186.4 75.<br>187.3 75. |          | 242.0          |                |
| 23               | 21.3         | 8.6   | 83          | 77.0           |              | 143        | 182.6                                  |              | 202         | 188.2 76.              |          | 243.8          |                |
| 24               | 22.3         | 9.0   | 84          | 77.9           |              | 144        | 133.5                                  |              | 204         | 189.1 76.              |          | 244.8          |                |
| -25              | 23.2         |       | 85          | 78.8           | 31.8         | 145        | 194.4                                  |              | 205         | 190.1 76.              |          | 245.7          | 99.3           |
| 26               | 24.1         |       | 86          | 79.7           | 32.2         | 146        | 135.4                                  |              | 206         | 191,0 77.              |          | 246.6          |                |
| 27<br>28         | 25.0         |       | 87          | 80.7           | 32.6         | 147        | 136.3                                  |              | 207         | 191.977.               |          |                | 100.0          |
| 29               | 26.0<br>26.9 |       | 88          | 81.6<br>82.5   |              | 148        | 137.2                                  | 55.4<br>55.8 |             | 192.9 77.              |          |                | 100.4          |
| 30               | 27.8         |       | 90          | 83.4           | 33.3<br>33.7 | 149        | 138.2<br>139.1                         | 56.2         | 209<br>210  | 193.8 78.<br>194.7 78. |          |                | 100.8          |
|                  | <u> </u>     |       |             | !              |              |            |  | ·            |             |                        | _ -      | -              | <u> </u>       |
| 31<br><b>3</b> 2 | 28.7<br>29.7 |       | 91          | 84.4           | 34.1         | 151        | 140.0                                  |              | 211         | 195.6 79.              |          |                | 101.5          |
| 33               | 30 6         |       | 92<br>93    | 85.3<br>86.2   | 34.5<br>34.8 | 152<br>153 | 140,9                                  |              | 212         | 196.6 79.              |          |                | 101.9          |
| 34               | 31.5         |       | 94          | 87.2           | 37.0         | 154        | 141,9<br>142.8                         |              | 213<br>214  | 197.5 79.<br>198.4 80. |          |                | 102.3<br>102.6 |
| 35               | 32.5         |       | 95          | 88.1           | 35.6         | 155        | 143.7                                  |              | 215         | 199.3 80.              |          |                | 103.0          |
| 36               | 83.4         | 13.5  | 96          | 89.0           |              | 156        | 144.6                                  |              |             | 200.880.               |          |                | 103.4          |
| 37               | 34.8         |       | 97          | 89.9           | 36.3         | 157        | 145.6                                  |              | 217         | 201.281.               | S 277    |                | 103.8          |
| 38               | 35.2         |       | 98          | 90.9           | 36.7         | 158        | 146.5                                  |              | 218         | 202.181.               |          |                | 104.1          |
| 89<br>40         | 36.2<br>37.1 |       | 100         | 91.8           | 37.1         | 159        | 147.4                                  | 1 1          |             | 203.182.               |          |                | 104.5          |
|                  |              |       | <b> </b>    | 92.7           | 37.5         | 160        | 148.3                                  | 59.9         | 220         | 204.082.               | -}       | 259.6          | 104.9          |
| 41               | 38.0         |       | 101         | 98.6           | 37.8         | 161        | 149.3                                  |              | 221         | 204.982.               |          |                | 105.3          |
| 42               | 38.9         |       | 102         | 94.6           | 38.2         | 162        | 150.2                                  |              | 222         | 205.883.               |          |                | 105.6          |
| 43<br>44         | 39.9<br>40.8 |       | 103         | 95.5           | 38.6         | 163        | 151.1                                  |              | 223         | 206:883.               |          |                | 106.0          |
| 45               | 41.7         |       | 105         | 96.4<br>97.4   |              | 164<br>165 | 152.1<br>153.0                         |              | 224<br>225  | 207.783.<br>208.684.   |          |                | 106.4<br>106.8 |
| 46               | 42.7         |       | 106         | 98.5           | 39.7         | 166        | 153.9                                  |              | 226         | 209.584.               |          |                | 107.1          |
| 47               | 48.6         | 17.6  | 107         | 99.2           | 40.1         | 167        | 154.8                                  | 62.6         | 227         | 210.585.               |          |                | 107.5          |
| 48               | 44.5         |       | 108         | 100.1          | 40.5         | 168        | 155.8                                  | 62.9         | 228         | 211.485.               |          | 267.0          | 107.9          |
| 49               | 45.4         |       | 109         | 101.1          | 40.8         | 169        | 156.7                                  | 63.3         | 229         | 212.3 85.              | 289      | 268.0          | 108.3          |
| <i>5</i> ೧       | 46.4         | 18.7  | 110         | 102.0          | 41.2         | 170        | 157.6                                  | 63.7         | 230         | 213.886.               | 2 290    | 268 9          | 108.6          |
| 51               | 47.3         |       | 111         | 102.9          | 41.6         |            | 158.5                                  | 64.1         | 231         | 214.286.               |          |                | 109.0          |
| 52               | 48.2         |       |             | 103.8          |              | 172        | 159.5                                  | 64.4         | 232         | 215.186.               | 9 292    | 270.7          | 109.4          |
| 53<br>54         | 49.1         |       |             | 104.8          |              |            | 160.4                                  | 64.8         | 235         | 216.087.               | 3 293    | 271.7          | 109.8          |
| 54<br>55         | 50.1         |       | 114         | 105.7          | 42.7         |            | 161.3                                  | 65.2         | 234         | 217.087.               |          | 272.6          |                |
| 56               | 51.0<br>51.9 |       | 115         | 106.6<br>107.6 | 43.1         |            | 162.3                                  | 65.6         |             | 217.988.               |          | 273.5          |                |
| 57               | 52.8         |       |             | 108.5          | 43.8         |            | 163.2<br>164.1                         | 65.9<br>66.3 | 236         | 218.888.<br>219.788.   |          | 274.4<br>275.4 |                |
| 58               | 53.8         |       | 118         | 109.4          | 44.2         | 178        | 165.0                                  | 66.7         | 238         | 220.789.               |          | 276.3          |                |
| 59               | 54.7         | 22:1  | 119         | 110.3          | 44.6         | 179        | 166.0                                  | 67.1         |             | 221.689.               |          | 277.2          |                |
| 50               | 53.6         | 22.5  | 120         | 111.5          | 45.0         | 180        | 166.9                                  |              |             | 222.589.               |          | 378.2          |                |
| ist.             | Dep.         | D.Lat | Dist.       | Dep.           | D.Lat        | Dist.      | Dep.                                   | D.Lat        | Dist        | Dep. D.la              | Dist     | Den            | D.La           |
|                  |              |       |             |                |              |            |  |              | 27101.      | · zep. p.ia            | 11 2736. | ( Dep. )       |                |
|                  |              |       |             |                |              | 80         | Degre                                  | ees.         |             |                        |          |                |                |

|          |              | - KAV      | EKSE          | IADI           | ,E, 10       |            | Degri                    | L OF    | 11115          | ZUMD         |             | -              |                        |
|----------|--------------|------------|---------------|----------------|--------------|------------|--------------------------|---------|----------------|--------------|-------------|----------------|------------------------|
| 1        | D I          | Da-        | Dist.         | 113 T - c      | Da:: 1       |            | Degrees.                 | 1 11500 | D.L.af         | Den          | l Diet      | D.Lat          | Dep                    |
| Dist.    | D.Lat        | рер.       | Dist.         | D.Lat          | Dep.         | Dist.      | D.Lat Dep                | 1:      | -!             | <u></u>      |             |                | <u> </u>               |
| 1        | 0.9          | 0.4        | 61            | 56.2           | 23.8         | 121        | 111.4 47.9               | 11.     | 166.6          | 70.7         | 241         | 221.8          | 94.5                   |
| 2        | 1.8          | 0.8        | 62            | 57.1           | 24.2         | 122        | 112.3 47.7               |         | 167.5          | 71.1         |             | 222.8          | 94.6                   |
| 8        | 2.8          | 1.2        | 63            | 58.0           | 24.6         | 123        | 113.248.1                |         | 168.5<br>169.4 | 71.5         | 243<br>244  | 223.7<br>224.6 | 95.5                   |
| 5        | 3.7          | 1.6<br>2.0 | 64            | 58.9           | 25.0         | 124<br>125 | 114.148.8<br>115.148.8   |         | 170.3          | 71.9<br>72.8 | 245         | 225.5          | 95.7                   |
| 6        | 4.6<br>5.5   | 2.3        | 65<br>66      | 59.8<br>60.8   | 25.4<br>25.8 | 125        | 116.0 49.2               |         | 171.2          | 72.7         | 246         | 226.4          | 96.1                   |
| 7        | 6.4          | 2.7        | 67            | 61.7           | 26.2         | 127        | 116.9 49.0               |         | 172.1          | .73.1        | 247         | 227.4          | 96.€                   |
| 8        | 7.4          | 3.1        | 68            | 62.6           | 26.6         | 128        | 117.8 50.0               |         | 173.1          | 73.5         | 248         | 228.3          | 96.9                   |
| 9        | 8.8          | 3.5        | 69            | 68.5           | 27.0         | 129        | 118.7 50.4               | 189     | 174.0          |              | 249         | 229.2          | 97.3                   |
| 10       | 9.2          | 3.9        | 70            | 64.4           | 27.4         | 130        | 119.7 50.8               | 190     | 174.9          | 74.2         | 250         | 230.1          | 97.7                   |
| 11       | 10.1         | 4.8        | 71            | 65.4           | 27.7         | 131        | 120.6 51.9               | 191     | 175.8          | 74.6         | 251         | 231.0          | 98.1                   |
| 12       | 11.0         | 4.7        | 72            | 66.8           | 28.1         | 132        | 121.551.6                |         | 176.7          | 75.0         | 252         | 232.0          |                        |
| 18       | 12.0         | 5.1        | 73            | 67.5           | 28.5         | 133        | 122.4 52.0               |         | 177.7          | 75.4         | 253         | 232.9          | 98.9                   |
| 14       | 12.9         | 5.5        | 74            | G8.1           | 28.9         | 134        | 123.3 52.4               |         | 178.6          | 75.8         | 254         | 233.8          |                        |
| 15       | 13.8         | 5.9        | 75            | 69.0           | 29.3         | 135        | 124.8 52.7               |         | 179.5          | 76.2         | 255         | 284.7          | 99.6                   |
| 16       | 14.7         | 6.3        | 76            | 70.0           | 29.7         | 136        | 125.2 53.1               |         | 180.4          | 76.6         | 256         | 235.6          |                        |
| 17       |              | 6.6        | 77            | 70.9           | 30. I        | 137        | 126.153.5                |         | 181.8          | 77.0         | 257<br>258  | 236.6<br>237.5 |                        |
| 18       |              | 7.0        | 78            | 71.8           | 30.5         | 138        | 127.053.9<br>128.054.9   |         | 182.3<br>183.2 | 77.4         | 259         | 238.4          |                        |
| 19<br>20 | 17.5<br>18.4 | 7.4<br>7.8 | 79<br>80      | 72.7           |              | 139<br>140 | 128.9 54.                |         | 184.1          | 78.1         | 260         | 239.3          |                        |
|          |              |            | ' <del></del> |                | 31.3         |            |                          | ·!      | _'             | !            | <del></del> |                | <u> </u>               |
| 21       | 19.3         | 8.2        | 81            | 74.6           | Ś1.6         | 141        | 129.8 55.1               |         | 185.0          |              | 261         | 240.8<br>241.2 | 102.0                  |
| 22       | 20.3         | 8.6        | 82            | 75.5           | 32.0         | 142        | 130.7 55.8               |         | 185.9          | 78.9<br>79.3 | 262<br>263  | 241.2<br>242.1 |                        |
| 23       | 21.2         | 9.0        | 83            | 76.4           | 32.4         | 143        | 1 <b>91.6 5</b> 5.9      |         | 186.9<br>187.8 | 4            | 264         | 248.0          |                        |
| 24<br>25 | 22.1         | 9.4<br>9.8 | 84<br>85      | 77.3           |              | 144<br>145 | 183.5 56.                |         | 188.7          | 80.1         | 265         | 243.9          |                        |
| 26       | 23.9         |            | 86            | 79.2           |              | 146        | 194.4 57.0               |         | 189.6          | 1            | 266         | 244.9          |                        |
| 27       | 24.9         |            | 87            | 80.1           | 34.0         | 147        | 185.8 57.4               |         | 190.5          | 80.9         | 267         | 245.8          |                        |
| 28       | 25.8         |            | 88            | 81.0           | 94.4         | 148        | 136.2 57.8               | 208     | 191.5          |              |             | 246.7          |                        |
| 29       | 26.7         |            | 89            | 81.9           | 34.8         | 149        | 137.2 58.9               |         | 192.4          |              | 269         | 247.6          |                        |
| 30       | 27.6         | 11.7       | 90            | 82.8           | S5.2         | 150        | 138.158.6                | 210     | 193.3          | 82.1         | 270         | 248.5          | 105.5                  |
| Si       | 28.5         | 12.1       | 91            | 83.8           | \$5.6        | 151        | 139.0 59.0               | 211     | 194.2          | 82.4         | 271         | 249.5          | 105.9                  |
| 32       | 29.5         |            | 92            | ,84.7          | 35.9         | 152        | 139.959.4                |         | 195.1          | 82.8         | 272         | 250.4          |                        |
| 33       | 30.4         |            | 93            | 85.6           | 36.3         |            | 140.8 59.8               |         | 196.1          | 83.2         | 273         | 251:3          |                        |
| 34       | 31.3         |            | 94            | 86.5           | 36.7         | 154        | 141.8 60.5               |         | 197.0          | 83.6         | 274         | 252.2          |                        |
| 35       | 32.2         |            | 95            | 87.4           | 37.1         | 155        | 142.7 60.6               |         | 197.9          | 84.0<br>84.4 | 275         | 253.1<br>254.1 |                        |
| 36<br>37 | 33.1         |            | 96<br>97      | 88.4<br>89.3   | 37.5<br>37.9 | 156<br>157 | 148.661.6<br>144.561.8   |         | 198.8          | 84.8         | 277         | 255.0          |                        |
| 38       | 35.0         |            | 98            | 99.2           | 58.3         | 158        | 145.461.7                | 11      | 200.7          | 85.2         | 278         | 255.9          |                        |
| 39       | 35.9         |            | 99            | 91.1           | 38.7         | 159        | 146.4 62.                |         | 201.6          | 1            | 279         | 256.8          | 109.0                  |
| 40       | 36.8         |            | 100           | 92.1           | 39.1         | 160        | 147.3 62.4               |         | 202.5          | 86.0         | 280         | 257.7          | 109.4                  |
| 41       | 37.7         | 16.0       | 101           | 93.0           | 39.5         | 161        | 148.2 62.9               | 221     | 203.4          | 86.4         | 281         | 258.7          | 109.8                  |
| 42       | 38.7         |            | 102           | 93.9           | 39.9         | 162        | 149.163.3                | 1 .     | 204.4          | 86.7         | 282         | 259.6          |                        |
| 43       | 39.6         |            | 103           | 94.8           | 40.2         | 163        | 150.063.7                |         | 205.3          |              | 283         | 260.5          |                        |
| 44       | 40.5         | 17.2       | 104           | 95.7           | 40.6         | 164        | 151.064.1                | 224     | 206.2          | 87.5         | 284         | 261.4          |                        |
| 45       | 41.4         |            | 105           | 96.7           | 41.0         | 165        | 151.9 64.5               |         | 207.1          | 87.9         | .285        | 262.3          |                        |
| 46       | 42.3         |            | 106           | 97.6           | 41.4         | 166        | 152.8 64.9               | 44      | 208.0          |              | 286         | 263.9          |                        |
| 47       | 43.3         |            | 107           | 98.5           | 41.8         | 167        | 153.7 65.8               |         | 209.0          |              | 287         | 264.2<br>265.1 |                        |
| 48<br>49 | 44.2         |            | 108<br>109    | 99.4           | 42.2<br>42.6 | 168<br>169 | 154.6 65.6               |         | 209.9          | 89.1<br>89.5 | 289         | 266.0          |                        |
| 50       | 46.0         |            | 110           | 100.3          | 43.0         | 170        | 155.6 66.4<br>156.5 66.4 |         | 211.7          | 89.9         | 290         | 266.9          |                        |
|          |              |            |               |                |              |            | <del> </del>             | ·!      | -'             |              |             | .!             |                        |
| 51       | 46 9         |            | 111           | 102.2          |              | 171        | 157.4 66.8               | .11     | 212.6          |              | 291         | 267.9<br>268.8 |                        |
| 52<br>53 | 47.93        |            |               | 103.1          | 43.8         |            | 158.367.5                |         | 213.6          | 90.6         |             | 269.7          |                        |
| 53<br>54 | 48.8         |            |               | 104.0<br>104.9 | 44.9<br>44.5 |            | 159.267.6<br>160.268.0   |         | 215.4          |              |             | 270.6          |                        |
| 55       | 50.6         |            | 115           | 105.9          | 44.9         |            | 161.168.4                |         | 216.3          |              | 295         | 271.5          |                        |
| 56       | 51.5         |            | 116           | 106.8          | 45.3         | 176        | 162.068.8                |         | 217.2          |              |             | 272 5          | 115.                   |
| 57       | 52.5         | 22.3       | 117           | 107.7          | 45.7         | 177        | 162.969.2                | 237     | 218.2          | 92.6         | 297         | 278.4          |                        |
| 58       | 53.4         | 22.7       | 118           | 108.6          | 46.1         | 178        | 168.869.6                | 238     | 219.1          | 93.0         |             | 274.3          |                        |
| 59       | 54.3         |            | 119           | 109.5          | 46.5         | 179        | 164.8 69.9               |         | 220.0          |              | 299         | 275.2          |                        |
| 60       | 55.2         | 23.4       | 120           | 110.5          | 46.9         | 180        | 165.7 70.9               | .11     | 220.9          | ·i           | 300         | 276.2          |                        |
| Dist.    | Dep.         | D.Lat      | Dist.         | Dep.           | D. i.at      | Dist.      | Dep. D.la                | I Dist. | Dep.           | DLat         | Dist.       | Dep.           | $\mathbf{L}\mathbf{L}$ |
|          | <del></del>  |            | ·             |                |              |            | 7 Degrees.               |         |                |              |             |                | :                      |
|          |              |            |               |                |              |            | 9                        |         |                |              |             |                |                        |

TABLE XIII.
TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

|            |                          |                  |                          |            | 4 Deg            |              |            |                |              |            |                |                        |
|------------|--------------------------|------------------|--------------------------|------------|------------------|--------------|------------|----------------|--------------|------------|----------------|------------------------|
| Dist.      | D.Lat Dep.               | Dist.            |                          | Dist.      | D.Lat            | Dep.         | Dist.      | D.Lat          | Dep.         | Dist.      | D.Lat          | Dep.                   |
| 1<br>2     | 0.9 0.4                  | 61               | 55.7 24.8                | 121        | 110.5            |              | 181        | 165.4          | 73.6         | 241        | 220.2          | 98.0                   |
| 3          | 1.8 0.8<br>2.7 1.2       | 62<br>63         | 56.625.2<br>57.625.6     | 122<br>123 | 111.5            |              | 182<br>183 | 166.3<br>167.2 | 74.0<br>74.4 |            | 221.1<br>222.0 | 98.4<br>98.8           |
| 4          | 3.7 1.6                  | 64               | 58.5 26.0                | 124        | 113.3            |              | 184        | 168.1          | 74.8         | 244        | 222.9          | 99.2                   |
| 5          | 4.6 2.0                  | 65               | 59.4 26.4                | 125        | 114.2            |              | 185        | 169.0          | 75.2         |            | 223.8          | 99.7                   |
| 6<br>7     | 5.5 2.4<br>6.4 2.8       | 66<br>67         | 60.326.8<br>61.227.3     | 126<br>127 | 115.1<br>116.0   | 51.2<br>51.7 | 186<br>187 | 169.9<br>170.8 | 75.7<br>76.1 | 246<br>247 | 224.7<br>225.6 |                        |
| 8          | 7.3 3.3                  | 68               | 62.1 27.7                | 128        | 116.9            | 52.1         | 188        | 171.7          | 76.5         | 248        | 226.6          |                        |
| 9          | 8.2 5.7                  | 69               | 63.0 28.1                | 129        | 117.8            | 52.5         | 189        | 172.7          | 76.9         | 249        | 227.5          |                        |
| 10         | 9.1 4.1                  | 70               | 63.9 28.5                | 130        | 118.8            |              | 190        | 173.6          | 77.8         | 250        | 228.4          |                        |
| 11<br>12   | 10.0 4.5<br>11.0 4.9     | 71<br>72         | 64.9 28.9<br>65.8 29.3   | 131<br>132 | 119.7<br>120.6   | 53.3<br>53.7 | 191        | 174.5<br>175.4 | 77.7<br>78.1 | 251<br>252 | 229,3<br>230.2 |                        |
| 13         | 11.9 5.8                 | 73               | 66.7 29.7                | 133        | 121.5            |              | 193        | 176.3          | 78.5         | 253        |                | 102.9                  |
| 14         | 12.8 5.7                 | 74               | 67.6 30.1                | 134        | 122.4            | 54.5         | 194        | 177.2          | 78.9         | .254       | 232.0          | 103.5                  |
| 15<br>16   | 13.7 6.1<br>14.6 6.5     | 75<br>76         | 68.530.5<br>69.430.9     | 135        | 123.3            |              | 195        | 178.1<br>179.1 | 79.3         |            | 233.0<br>233.9 | 103.7                  |
| 17         | 15.5 6.9                 | 77               | 70.3 31.3                | 136<br>137 | 124.2<br>125.2   | 55.3<br>55.7 | 193        | 180.0          | 79.7<br>80.1 | 257        |                | 104.5                  |
| 18         | 16.4 7.5                 | 78               | 71.331.7                 | 138        | 126.1            | 56.1         | 198        | 180.9          | 80.5         | 258        | 235.7          | 104.9                  |
| 19<br>20   | 17.4 7.7<br>18.3 8.1     | 79<br>80         | 72.232.1                 | 139        | 127.0            |              | 199        | 181.8          | 80.9         | 259        | 236.6          |                        |
|            |                          |                  | 73.1 32.5                | 140        | 127.9            | 56.9         | 200        | 182.7          | 81.8         | 260        | 237.5          |                        |
| 21<br>22   | 19.2 8.5<br>20.1 8.9     | 81<br>82         | 74.0 32.9<br>74.9 33.4   | 141<br>142 | 128.8<br>129.7   | 57.3<br>57.8 | 201        | 183.6<br>184.5 | 81.8<br>82.2 | 261<br>262 | 238.4          | 106.2<br>106.6         |
| 23         | 21.0 9.4                 | 83               | 75.8 33.8                |            | 130 6            | 58.2         | 203        | 185.4          | 82.6         |            |                | 107.0                  |
| 24         | 21.9 9.8                 | 84               | 76.734.2                 | 144        | 131.6            | 58.6         | 204        | 186.4          | 83.0         |            |                | 107.4                  |
| 25<br>26   | 22.8 10.2<br>23.8 10.6   | 8 <i>5</i><br>86 | 77.734.6<br>78.635.0     | 145<br>146 | 132.5<br>133.4   | 59.0<br>59.4 | 205        | 187.3<br>188.2 | 83.4<br>83.8 | 265<br>266 | 242.1<br>243.0 |                        |
| 27         | 24.7 11.0                | 87               | 79.5 35.4                | 147        | 134.3            | 59.8         | 207        | 189.1          |              |            | 243.9          |                        |
| 28         | 25.6 11.4                | 88               | 80.4 35.8                | 148        | 135.2            | 60.2         | 208        | 190.0          |              | 268        |                | 109.0                  |
| 29<br>30   | 26.5 11.8<br>27.4 12.2   | 89<br>90         | 81.336.2<br>82.236.6     | 149<br>150 | 136.1<br>137.0   | 60.6         | 209<br>210 | 190.9<br>191 8 |              | 269<br>270 |                | 109.4<br>109.8         |
| 31         | 28.3 12.6                | 91               |                          |            |                  | 61.4         |            | 192.8          |              | 271        | 247.6          |                        |
| 32         | 29.2 13.0                | 92               | 83.1 37.0<br>84.0 37.4   | 151<br>152 | 137.9 $138.9$    |              | 211<br>212 | 193.7          | 85.8<br>86.2 | 271        | 248.5          | 110.2                  |
| 33         | 80.1 13.4                | 93               | 85.0 37.8                | 153        | 139.8            | 62.2         | 213        | 194.6          | 86.6         | 273        | 249.4          | 111.0                  |
| 84<br>85   | 31.113.8                 | 94               | 85.938.2                 |            | 140.7            | 62.6         |            | 195.5          |              | 274        | 250.3<br>251.2 |                        |
| 36         | 32.9 14.6                | 95<br>96         | 86.8 38.6<br>87.7 39.0   | 155<br>156 | 141.6<br>142.5   | 63.0<br>63.5 |            | 196.4<br>197.3 | 87.4<br>87.9 | 275<br>276 | 252.1          |                        |
| 37         | 83.8 15.0                | 97               | 88.6 39.5                | 157.       | 143.4            | 63.9         | 217        | 198.2          | 88.3         | 277        | 253.1          | 112.7                  |
| 38<br>39   | 34.7:15.5  <br>35.6:15.9 | 98               | 89.539.9                 | 158        | 144.3            | 64.3         | 218        | 199.2          | 88.7         | 278        | 254.0          | 113.1<br>11 <b>3.5</b> |
| 40         | 36.5,16.3                | 99<br>100        | 90.4 40.3                | 159<br>160 | $145.3 \\ 146.2$ | 64.7         | 219<br>220 | 200.1<br>201.0 | 89.1<br>89.5 | 279<br>280 | 255.8          |                        |
| .41        | 37.5,16:7                | 101              | 92.3 41.1                | 161        | 147.1            | 65.5         |            | 201.9          | 89.9         | 281        | .'             | 114.3                  |
| 42         | 38.4.17.1                | 102              | 93.241.5                 |            | 148.0            |              | 222        | 202.8          | 90.3         | 282        | 257.6          | 114.7                  |
| 43         | 39.3 17.5                | 103              | 94.1 41.9                |            | 148.9            |              | 223        | 203.7          | 90.7         | 283        | 258.5          |                        |
| 44<br>45   | 40.217.9<br>41.1 18.9    | 104              | 95.0 42.3<br>95.9 42.7   | 164        | 149.8<br>150.7   | 66.7<br>67.1 | 224<br>225 | 204.6<br>205.5 | 91.1<br>91.5 | 284<br>285 | 260.4          | 115.5                  |
| 46         | 42.0 18.7                | 106              | 96.8 43.1                | 166        | 151.6            |              | 226        | 206.5          | 91.9         | 286        | 261.3          | 116.3                  |
| 47         | 42.919.1                 | 107              | 97.743.5                 | 167        | 152.6            | 67.9         | 227        | 207.4          | 92.3         | 287        | 262.2          |                        |
| 48<br>49   | 43.919.5<br>44.8 19.9    | 108              | 98.743.9<br>99.644.3     | 168        | 153.5<br>154.4   | 68.3<br>68.7 | 228<br>229 | 208.3<br>209.2 | 92.7<br>93.1 | 288<br>289 | 263.1<br>264.0 | 117.1                  |
| <i>5</i> 0 | 45.7 20.3                | 110              | 100.5 44.7               | 170        | 155.3            |              | 230        | 210.1          | 93.5         | 290        |                | 118.0                  |
| 51         | 46.6 20.7                | 111              | 101.4 45.1               | 171        | 156.2            | 69.6         | 231        | 211.0          | 94.0         | 291        | 265.8          |                        |
| 52         | 47.5 21.2                |                  | 102.3 45.6               |            | 157.1            | 70.0         | 232        | 211.9          | 94.4         |            | 266.8          |                        |
| 53<br>54   | 48.421.6<br>49.822.0     | 113              | 103.2 46.0<br>104.1 46.4 |            | 158.0<br>159.0   |              |            | 212.9<br>213.8 | 94.8<br>95.2 |            | 267.7<br>268.6 | 119.2                  |
| 55         | 50.222.4                 | 115              | 105.1 46.8               | 175        | 159.9            |              |            | 214.7          | 95.6         |            | 269.5          |                        |
| 56         | 51.2 22.8                | 116              | 106.0 47 12              | 176        | 160.8            | 71.6         | 236        | 215.6          | 96.0         | 296        | 270.4          | 120.4                  |
| 57<br>58   | 52.123.2<br>53.023.6     | 117              | 106.9 47.6               | 177        | 161.7<br>162.6   |              |            | 216.5<br>217.4 | 96.4         |            |                | 120.8<br>121.2         |
| 59         | 53.924.0                 | 118              | 107.8 48.0<br>108.7 48.4 |            | 163.5            |              |            | 218.3          |              |            |                | 121.6                  |
| 60         | 54.8 24.4                | 120              | 109.6 48.8               | 180        | 164.4            |              |            | 219.3          |              |            |                | 122.0                  |
| hst.       | Dep. DLat                | Dist.            | Dep. D.lat               | Dist.      | Dep.             | D.Lat        | Dist.      | Dep.           | DLat         | Dist.      | Dep.           | D.Lat                  |
|            |                          |                  |                          |            | 6 Deg            |              |            |                |              |            | <del></del>    | •                      |

# TABLE XIII. TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

| -        |              |            | -        |                        | 5          | 25 Deg         | rees.        |            |                  |              |            |                            |
|----------|--------------|------------|----------|------------------------|------------|----------------|--------------|------------|------------------|--------------|------------|----------------------------|
| Dist.    | D.L.at       | Dep.       | Dist.    | D.Lat Dep.             |            |                | Dep.         | Dist.      | DLat             | Dep.         | Dist.      | D.L.at Dep.                |
| 1        | 0.9          | 0.4        | 61       | 55.8 25.8              |            | 109.7          | 51.1         | 181        | 164.0            | 76.5         | 241        | 218.4 101.9                |
| 2        | 1.8          |            | 62       | 56.226.2               | 122        | 110.6          | 51.6         | 182        | 164.9            | 76.9         | 242        | 219.3 102.3                |
| 8 4      | 2.7<br>3.6   | 1.3        | 63       | 57.126.6<br>58.027.0   | 123<br>124 | 111.5          |              | 183<br>184 | 165.9<br>166.8   | 77.3         | 243        | 220.2 102.7<br>221 1 103.1 |
| 5        | 4.5          |            | 65       | 58.927.5               | 125        | 113.3          | 52.8         | 185        | 167.7            | 78.2         | 245        | 222.0 103.5                |
| 6        | 5.4          |            | 66       | 59.8 27.9              | 126        | 114.2          | 53:2         | 186        | 168.6            | 78.6         | 246        | 223.0 104.0                |
| 7        | 673          |            | 67       | 60.7 28.3              | 127        | 115.1          | 53.7         | 187        | 169.5            | 79.0         | 247        | 223.9 104.4                |
| 8        | 7.3          |            | 68       | 61.6 28.7              | 128        | 116.0          |              | 188        | 170.4            | 79.5         | 248        | 224.8 104.8                |
| 9<br>10  | 8.2          | 3.8        | 69       | 62.529.2               | 129        | 116.9          | 54.5         | 189        | $171.3 \\ 172.2$ | 79.9<br>80.3 | 249<br>250 | 225.7 105.2                |
|          | 9.1          | 4.2        | 70       | 63.4 29.6              | 130        | 117.8          | 54.9         | 190        |                  |              |            | 226.6 105.7                |
| 11       | 10.0         | 4.6        | 71       | 64.8 30.0              | 131        | 118.7          | 55.4         | 191        | 173.1            | 80.7         | 251        | 227.5 106.1                |
| 12<br>13 | 10.9<br>11.8 |            | 72<br>73 | 65.3 30.4              | 132        | 119.6          | 55.8         | 192        | 174.0<br>174.9   | 81.1         | 252<br>253 | 228.4 106.5<br>229.3 106.9 |
| 14       | 12.7         |            | 74       | 66.2 30.9<br>67.1 31.3 | 133<br>134 | 120.5<br>121.4 | 56.2<br>56.6 | 193        | 175.8            | 82.0         | 254        | 230.2 107.3                |
| 15       | 15.6         |            | 75       | 68.0 31.7              | 185        | 122.4          | 57.1         | 195        | 176.7            | 82.4         | 255        | 231.1 107.8                |
| 16       | 14.5         |            | 76       | 68.9 32.1              | 136        | 123.3          | 57.5         | 196        | 177.6            | 82.8         | 256        | 292.0 108.2                |
| 17       | 15.4         |            | 77       | 69.8 32.5              | 197        | 124.2          | 57.9         |            | 178.5            | 83.3         | 257        | 232.9 108.6                |
| 18       | 16.3         |            | 78       | 70.7 33.0              | 138        | 125.1          | 58.3         | 198        | 179.4            |              | 258        | 233.8 109.0                |
| 19<br>20 | 17.2<br>18.1 | 8.0<br>8.5 | 79<br>80 | 71.633.4               | 139<br>140 | 126.0<br>126.9 |              | 199<br>200 | 180.4<br>181.3   | 84.1<br>84.5 | 259<br>260 | 234.7 109.5<br>235.6 109.9 |
|          |              |            |          |                        | <u>'</u>   |                |              |            |                  |              |            |                            |
| 21       | 19.0         |            | 81       | 73.434.2               | 141        | 127.8          | 59.6         | 201        | 18 .2            | 84.9         | 261        | 236.5 110.3                |
| 22<br>23 | 19.9<br>20.8 |            | 82<br>83 | 74.8 34.7<br>75.2 35.1 | 142        | 128.7<br>129.6 | 60.0<br>60.4 | 202        | 183.1<br>184.0   | 85.4<br>85.8 | 262<br>263 | 237.5 110.7<br>238.4 111.1 |
| 24       | 21.8         |            | 84       | 76.1 35.5              | 144        | 130.5          | 60.9         | 204        | 184.9            | 86:2         | 264        | 239.3 111.6                |
| 25       | 22.7         |            | 85       | 77.0 35.9              | 145        | 131.4          | 61.3         | 205        | 185.8            | 86.6         | 265        | 240.2 112.0                |
| 26       | 23.6         |            | 86       | 77.9 36.3              | 146        | 132.3          | 61.7         | 206        | 186.7            | 87.1         | 266        | 241.1112.4                 |
| 27       | 24.5         |            | 87       | 78.8 36.8              |            | 133.2          | 62.1         | 207        | 187.6            | 87.5.        | 267        | 242.0 112.8                |
| 28<br>29 | 25.4<br>26.3 |            | 88<br>89 | 79.8 37.2<br>80.7 37.6 | 148<br>149 | 134.1<br>135.0 | 62.5<br>63.0 | 208        | 188.5<br>189.4   | 87.9<br>88.3 | 268<br>269 | 242.9 113.3<br>243.8 113.7 |
| 30       | 27.2         |            | 90       | 81.638.0               |            | 135.9          | 63.4         | 210        | 190.5            | 88.7         | 270        | 244.7 114.1                |
|          |              |            |          |                        |            |                |              | '          | i                |              |            |                            |
| 31<br>32 | 28.1<br>29.0 |            | 91<br>92 | 82.5 38.5<br>83.4 38.9 | 151<br>152 | 136.9<br>137.8 | 63.8<br>64.2 | 211<br>212 | 191.2<br>192.1   | 89.2<br>89.6 | 271<br>272 | 245.6 114.5<br>246.5 115.0 |
| 33       | 29.9         |            | 93       | 84.3 39.3              | 153        | 138.7          | 64.7         | 213        | 193.6            | 90.0         | 278        | 247.4 115.4                |
| 34       | 30.8         |            | 94       | 85.239.7               | 154        | 139.6          |              | 214        | 198.9            | 90.4         | 274        | 248.3 115.8                |
| 35       | 31.7         |            | 95       | 86.140.1               | 155        | 140.5          | 65.5         | 215        | 194.9            | 90.9         | 275        | 249.2 116.2                |
| 36<br>37 | 32.6         |            | 96       | 87.040.6               |            | 141.4          | 65 49        | 216        | 195.8            | 91.3         | 276        | 250.1 116.6                |
| 38       | 33.5<br>34.4 |            | 97<br>98 | 87.941.0<br>88.841.4   | 157<br>158 | 142.3<br>143.2 | 66.4         | 217        | 196.7<br>197.6   | 91.7         | 277<br>278 | 251.0 117.1<br>252.0 117.5 |
| 39       | 35.9         |            | 99       | 89.741.8               | 159        | 144.1          | 67.2         | 219        | 198.5            | 92.6         | 279        | 252.9117.9                 |
| 40       | 36.3         |            | 100      | 90.6 42.3              |            | 145.0          | 67.6         | 220        | 199.4            | 93.0         | 280        | 253.8 118.3                |
| 41       | 37.2         | 17.3       | 101      | 91.5 42.7              | 161        | 145.9          | 68.0         | 221        | 200.3            | 93.4         | 281        | 254.7 118.8                |
| 42       | 38.1         |            | 102      | 92,4,43.1              |            | 146.8          | 68.5         | 222        | 201.2            |              | 282        | 255.6 119.2                |
| 43       | 39.0         |            | 103      | 93.3 43.5              | 168        | 147.7          | 68.9         | 223        | 202.1            | 94.2         | 283        | 256.5 119.6                |
| 44       | 89.9         |            | 104      | 94.3 44.0              |            | 148.6          | 69.3         | 224        | 203.0            | 94.7         | 284        | 257.4 120.0                |
| 45<br>46 | 40.8         |            | 105      | 95.244.4               | 165<br>166 | 149.5<br>150.4 | 69.7         | 225<br>226 | 203.9<br>204.8   | 95.1         | 285<br>286 | 258.3 120.4                |
| 47       | 41.7<br>42.6 |            | 106      | 96.1.44.8<br>97.0.45.2 |            | 151.4          | 70.2<br>70.6 | 227        | 204.8            | 95.5<br>95.9 | 287        | 259.2 120.9<br>260.1 121.3 |
| 48       | 43.5         |            | 108      | 97.945.6               | 168        | 152.3          | 71.0         | 228        | 206.6            | 96.4         | 288        | 261.C 121.7                |
| 49       | 44.4         | 20.7       | 109      | 98.8 46.1              | 169        | 158.2          | 71.4         | 229        | 207.5            | 96.8         | 289        | 261.9 122.1                |
| 50       | 45.3         | 21.1       | 110      | 99.7 46.5              | 170        | 154.1          | 71.8         | 230        | 208.5            | 97.2         | 290        | 262.8 122.6                |
| 51       | 46.2         |            | 111      | 100.6 46.9             | 171        | 155.0          | 72.3         | 231        | 209.4            | 97.6         | 291        | 263.7 123.0                |
| 52       | 47.1         | 22.0       | 112      | 101.5 47.8             | 172        | 1,55.9         | 72.7         | 232        | 210.3            | 98.0         | 292        | 264.6 123.4                |
| 53       | 48.0         |            | 113      | 102.4 47.8             | 178        | 156.8          | 73.1         | 233        | 211.2            | 98.5         | 293        | 265.5 123.8                |
| 54       | 48.9         |            | 114      | 100,3,48.2             |            | 157.7          |              |            | 212.1            |              | 294        | 266.5 124.2                |
| 55<br>56 | 49.8<br>50.8 |            | 115      | 104.248.6<br>105.149.0 |            | 158.6<br>159.5 |              |            | 213.0 $213.9$    |              | 295<br>296 | 267.4 124.7<br>268.3 125.1 |
| 57       | 51.7         |            | 117      | 106.049.4              |            | 160.4          |              |            | 214.8            |              |            | 269.2 125.5                |
| 58       | 52.6         | 24.5       | 118      | 106.949.9              | 178        | 161.3          | 75.2         | 238        | 215.7            | 100.6        | 298        | 270.1 125.9                |
| 59       | 53.5         |            | 119      | 107.9 50.3             |            | 162.2          |              |            | 216.6            |              |            | 271.0 126.4                |
| 60       | 54.4         |            | 120      | 108.8 50.7             | <b>'</b>   | 163.1          |              | '          | 217.5            |              |            | 271.9126.8                 |
| Dist.    | Dep.         | D.Lat      | Dist.    | Dep. D.hat             | Dist.      | Dep.           | D.Lat        | Dirt.      | Dep.             | D.I.at       | Dist.      | Dep. D.Lat                 |
|          |              |            |          |                        |            | 25 Dag         |              |            |                  |              |            |                            |

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TABLE XIII.

|          |              |              |            |                |              |            | 27 Deg           | Tees.        |               |                |                      |            | <del></del>    |               |
|----------|--------------|--------------|------------|----------------|--------------|------------|------------------|--------------|---------------|----------------|----------------------|------------|----------------|---------------|
| Dist.    | D.Lat        | Dep.         | Dist.      | D.Lat          | Dep.         |            | D.Lat            |              | Dist.         | D.Lat          | Dep.                 | Dist.      | D.Lat          | Dep.          |
| 1        | 0.9          | 0,5          | 61         |                | 27.7         | 121        | 107.8            | 54.9         | 181           | 161.3          | 82.2                 | 241        |                | 109.4         |
| 2        | 1.8          | 0.9          | 62         | 55.2           |              | 122        | 108.7            | 55.4         | 182           | 162.2          | 82.6                 | 242        | 215.6          |               |
| 3<br>4   | 2.7<br>3.6   | 1.4<br>1.8   | 63<br>64   | 57.0           | 28.6         | 123<br>124 | 109.6<br>110.5   | 55.8<br>56.3 | 183           | 163.1<br>163.9 | 83.1                 | 243<br>244 | 216.5<br>217.4 |               |
| 5        | 4.5          | 2.3          | 65         |                | 29.5         | 125        | 111.4            | 56.7         | 185           | 164.8          | 84.0                 | 245        | 218.3          |               |
| 6        | 5.3          | 2.7          | 66         |                | 30.0         | 126        | 112.3            | 57.2         | 186           | 165.7          | 84.4                 | 246        | 219.2          |               |
| 7        | 6.2          |              | 67         |                | 30.4         | 127        | 113.2            | 57.7         | 187           | 166.6          | 84.9                 | 247        | 220.1          |               |
| 8        | 7.1<br>8.0   | 3.6<br>4.1   | 68<br>69   |                | 30.9 $31.3$  | 128<br>129 | 114.0            | 58.1<br>58.6 | 188<br>189    | 167.5<br>168.4 | 85.4                 | 248<br>249 | 221.0<br>221.9 |               |
| 10       | 8.9          |              | 70         |                | 31.8         | 130        | 115.8            | 59.0         | 190           | 169.3          | 86.3                 | 250        |                | 113.5         |
| 11       | 9.8          | 5.0          | 71         | 68.3           | 32.2         | 131        | 116.7            | 59.5         | 191           | 170.2          | 86.7                 | 251        | 223.6          | 114.0         |
| 12       | 10.7         | 5.4          | 72         |                | 32.7         | 132        | 117\6            | 59.9         | 192           | 171.1          | 87.2                 | 252        | 224.5          | 114.4         |
| 13       | 11.6         |              | 73         |                | 33.1         | 133        | 118.5            | 60.4         | 193           | 172.0          | 87.6                 | 253        | 225.4          |               |
| 14       | 12.5<br>13.4 |              | 74<br>75   |                | 33.6<br>34.0 |            | 119.4<br>120.3   | 60.8<br>61.3 |               | 172.9<br>173.7 | 88.1<br>88. <i>5</i> | 254<br>255 | 226.3<br>227.2 |               |
| 16       | 14.3         | -            | 76         |                | 34.5         | 136        | 121.2            | 61.7         | 196           | 174.6          | 89.0                 | 256        | 228.1          |               |
| 17       | 15.1         | 7.7          | 77         |                | 35.0         |            | 122.1            | 62.2         | 197           | 175.5          | 89.4                 | 257        | 229.0          | 116.7         |
| 18       | 16.0         |              | 78         |                | 35.4         |            | 123.0            | • .          | 198           | 176.4          | 89.9                 | 258        | 229.9          |               |
| 19<br>20 | 16.9<br>17.8 | 8.6<br>9.1   | 79<br>80   |                | 35.9<br>36.3 | 139<br>140 | $123.8 \\ 124.7$ | 63.1<br>63.6 | 199<br>200    | 177.3<br>178.2 | 90.8                 | 259<br>260 | 230.8          | 117.6 $118.0$ |
|          |              |              |            |                | l            |            | <u> </u>         | !            | ! <del></del> | .'             |                      | ·          |                |               |
| 21<br>22 | 18.7         | 9.5<br>10.0  | 81<br>82   |                | 36.8<br>37.2 | 141<br>142 | 125.6<br>126.5   | 64.0<br>64.5 | 201           | 179.1<br>180.0 | 91.3<br>91.7         | 261<br>262 | 232.6<br>233.4 |               |
| 28       |              | 10.4         | 83         |                | 37.7         | 143        | 127.4            | 64.9         | 203           | 180.9          | 92.2                 | 263        | 234.3          |               |
| 24       | 21.4         | 10.9         | 84         | 74.8           | 38.1         | 144        | 128.3            | 65.4         | 204           | 181.8          | 92.6                 | 264        | 235.2          |               |
| 25       |              | 11.3         | 85         |                | 38.6         | 145        | 129.2            |              | 205,          | 182.7          | 93.1                 | 265        | 236.1          |               |
| 26<br>27 |              | 11.8<br>12.3 | . 86<br>87 |                | 39.0<br>39.5 | 146        | 130.1<br>131.0   | 66.3         | 206           | 183.5<br>184.4 | 93.5<br>94.0         | 266<br>267 | 237.0<br>237.9 | 121.2         |
| 28       | 24.9         |              | 88         |                | 40.0         | 148        | 131.9            |              | 208           | 185.3          | 94.4                 | 268        | 238.8          |               |
| 29       |              | 13.2         | 89         | 79.3           | 40.4         | 149        | 132.8            | 67.6         |               | 186.2          | 94.9                 | 269        | 239,7          |               |
| 30       | 26.7         | 13.6         | 90         | 80.2           | 40.9         | 1.50       | 133.7            | 68.1         | 210           | 187,1          | 95.8                 | 270        | 240.6          |               |
| 31       |              | 14.1         | 91         |                | 41.3         | 151        | 134.5            | 68.6         | 11            | 188.0          | 95.8                 | 271        | 241.5          |               |
| 32<br>33 |              | 14.5<br>15.0 | 92<br>93   |                | 41.8<br>42.2 |            | 135.4            | 69.0<br>69.5 |               | 188.9<br>189.8 | 96.2<br>96.7         | 272<br>273 | 242.4<br>243.2 |               |
| 34       |              | 15.4         | 94         |                | 42.7         | 154        | 137.2            | 69.9         | 214           | 190.7          | 97.2                 | 274        | 244.1          |               |
| 35       | 31.2         | 15.9         | 95         | 84.6           | 43.1         | 155        | 138.1            | 70.4         | 215           | 191.6          |                      | 275        | 245.0          |               |
| 36<br>37 |              | 16.3<br>16.8 | 96<br>97   |                | 43.6<br>44.0 | 156<br>157 | 139.Q<br>139.9   | 70.8<br>71.3 | 216<br>217    | 192.5<br>193.3 |                      | 276        | 245.9<br>246.8 |               |
| 38       | 33.9         |              | 98         |                | 44.5         |            | 140.8            | 71.7         | 218           | 194.2          |                      | 278        | 247.7          |               |
| 39       | 34.7         | 17.7         | 99         |                | 44.9         | 159        | 141.7            | 72.2         | 219           | 195.1          | 99.4                 | 279        | 248.6          |               |
| 40       | 95.6         | 18.2         | 100        | 89.1           | 45.4         | 160        | 142.6            | 72.6         | 220           | 196.0          | 99.9                 | 280        | 249.5          | 127.1         |
| 41       | 36.5         |              | 101        |                | 45.9         | 161        | 143.5            | 78.1         |               | 196.9          |                      | 281        |                | 127.6         |
| 42<br>43 | 37.4<br>38.3 |              | 102        |                | 46.3<br>46.8 |            | 144.3<br>145.2   | 73.5<br>74.0 | 222<br>223    | 197.8<br>198.7 | 100.8                | 282        | 251.3<br>252.2 |               |
| 44       | 39.2         |              | 103        |                | 47.2         |            | 146.1            | 74.5         | 224           | 199.6          |                      | 284        | 253.0          |               |
| 45       | 40.1         | 20.4         | 105        | 93.6           | 47.7         | 165        | 147.0            | 74.9         | 225           | 200.5          | 102.1                | 285        | 253.9          |               |
| 45       | 41.0         | 20.9<br>21.3 | 106<br>107 |                | 48.1<br>48.6 | 166<br>167 | 147.9<br>148.8   | 75.4<br>75.8 | 226<br>227    | 201.4          |                      | 286<br>287 | 254.8<br>255.7 |               |
| 48       |              | 21.8         | 107        |                | 49.0         |            | 149.7            | 76.3         |               | 203.1          |                      | 288        | 256.6          |               |
| 49       | 43.7         | 22.2         | 109        | 97.1           | 49.5         | 169        | 150.6            | 76.7         | 229           | 204.0          | 104.0                | 289        | 257.5          | 131.2         |
| 50       | 44.6         | 22.7         | 110        | 98.0           | 49.9         | 170        | 151.5            | 77.2         | 230           | 204.9          | 104.4                | 290        | 258.4          | 191.7         |
| 51       | 45.4         |              | 111        |                | 50.4         |            | 152.4            |              |               | 205.8          |                      | 291        | 259.3          |               |
| 52       |              | 23.6<br>24.1 | 112        |                | 50.8         |            | 153.3            | 78.1<br>78.5 |               |                | 105.3                | 292<br>293 | 260.2 $261.1$  |               |
| 53<br>54 |              | 24.5         |            | 100.7<br>101.6 |              |            | 154.1<br>155.0   | 79.0         |               | 208.5          |                      | 294        | 262.0          |               |
| 55       | 49.0         | 25.0         | 115        | 102.5          | 52.2         | 175        | 155.9            | 79.4         | 235           | 209.4          | 106.7                | 295        | 262.8          |               |
| 56       |              | 25.4         |            | 103.4          |              |            | 156.8            |              |               | 210.3          |                      | 296        | 263.7<br>264.6 |               |
| 57<br>58 |              | 25.9<br>26.3 |            | 104.2<br>105.1 |              | 177<br>178 | 157.7<br>158.6   | 80.4<br>80.8 | 237<br>238    | 211.2<br>212.1 |                      | 297<br>298 | 265.5          |               |
| 59       | 52.6         | 26.8         | 119        | 106.0          | 54.0         | 179        | 159.5            |              |               |                | 108.5                | 299        | 266.4          | 135.7         |
| 60       | 53.5         | 27.2         |            | 106.9          |              | 180        | 160.4            | 81.7         | 240           | 213.8          |                      | 300        | 267.3          |               |
| Dist.    | Dep.         | D. Lat       | Dist.      | Dep.           | D.lat        | Dist.      | Dep.             | D.Lat        | Dist.         | Dep.           | D.Lat                | Dist.      | Dep.           | D.Lat         |
|          |              | -            |            |                |              |            | 53 Deg           | rees.        |               |                |                      |            |                |               |
| 1        | -            | -            |            |                |              |            |                  |              |               |                |                      |            |                |               |

#### TABLE XIII.

|                  |                        |            |                          |       | 28 Deg         | rees.        |            |                | 2              |            |                |                |
|------------------|------------------------|------------|--------------------------|-------|----------------|--------------|------------|----------------|----------------|------------|----------------|----------------|
| )ist.            | D.Lat Dep.             | Dist.      | D.Lat Dep                | Dist. | D.Lat          | Dep.         | Dist.      | DLat           | Dep            | Dist.      | D.Lat          | Dep.           |
| 1                | 0.9 0.5                | 61         | 53.9 28.6                |       | 106.8          | 56.8         | 181        | 159.8          | 85.0           | 241        | 212.8          | 113.1          |
| 2                | 1.8 0.9                | 62         | 54.7 29.1                |       | 107.7          | 57.8         | 182        | 160.7          |                | 242        | 213.7          |                |
| 3                | 2.6 1.4<br>3.5 1.9     | 63<br>64   | 55.6 29.6<br>56.5 30.0   |       | 108.6          | 57.7<br>58.2 | 183<br>184 | 161.6<br>162.5 | - 1            | 243        | 214.6<br>215.4 |                |
| 5                | 4.4 2.8                | 65         | 57.4 30.5                |       | 110.4          | 58.7         | 185        | 163.3          |                | 245        | 216.3          |                |
| 6                | 5.3 2.8                | 66         | 58.331.0                 |       | 111.3          |              | 186        | 164.2          | 87.3           | 246        | 217.2          |                |
| 7                | 6.2 3.3<br>7.1 3.8     | 67<br>68   | 59.231.5<br>60.031.9     |       | 112.1          | 59.6         | 187        | 165.1          |                | 247        |                | 116.0          |
| 9                | 7.9 4.2                | 69         | 60.932.4                 |       | 113.0          |              | 188        | 166.0<br>166.9 |                | 248<br>249 | 219.0<br>219.9 |                |
| 10               | 8.8 4.7                | 70         | 61.8 32.9                |       | 114.8          |              |            | 167.8          |                | 250        | 220.7          |                |
| 11               | 9.7 5.2                | 71         | 62.7 33.3                |       | 115.7          | 61.5         | 191        | 168.6          | 89.7           | 251        | 221.6          | 117 8          |
| 12               | 10.6 5.6               | 72         | 63.633.8                 |       | 116.5          | 62.0         | 192        | 169.5          |                | 252        | 222.5          | 118.3          |
| IS<br>14         | 11.5 6.1<br>12.4 6.6   | 73<br>74   | 64.5 34.8                |       | 117.4          |              | 193        | 170.4<br>171.3 |                | 253<br>254 | 223.4<br>224.3 |                |
| 15               | 13.2 7.0               | 75         | 66.235.2                 |       | 119.2          | 68.4         |            | 172.2          | 91.5           | 255        | 225.2          |                |
| 16               | 14.1 7.5               | 76         | 67.1 35.7                |       | 120.1          | 63.8         |            | 173.1          | 92.0           | 256        | 226.0          |                |
| 17<br>18         | 15.0 8.0<br>15.9 8.5   | 77<br>78   | 68.036.1                 |       | 121.0          |              | 197        | 173.9          |                | 257        | 226.9          |                |
| 19-              | 16.8 8.9               | 79         | 68.936.6<br>69.837.1     |       | 121.8<br>122.7 | 64.8<br>65.3 | 198        | 174.8<br>175.7 | 93.0<br>93.4   | 258<br>259 | 227.8<br>228.7 | 121.1          |
| 20               | 17.7 9.4               | 80         | 70.637.6                 |       | 123.6          |              | 200        | 176.6          |                | 260        | 229.6          | 122.1          |
| 21               | 18.5 9.9               | 81         | 71.5 38.0                |       | 124.5          | 66.2         | 201        | 177.5          | 94.4           | 261        | 230.4          | 122.5          |
| 22<br>23         | 19.4 10.3<br>20.3 10.8 | 82<br>83   | 72.438.5                 |       | 125.4          |              | 202        | 178.4          | 94.8           | 262        | 231.3          |                |
| 24               | 21.2 11.3              | 84         | 73.339.0<br>74.239.4     |       | 126.3<br>127.1 | 67.1<br>67.6 | 203<br>204 | 179.2<br>180.1 | 95.8<br>95.8   | 263<br>264 | 232.2 $233.1$  |                |
| 25               | 22.1 11.7              | 85         | 75.1 39.9                |       | 128:0          |              | 205        | 181.0          |                | 265        | 234.0          |                |
| 26               | 23.0 12.2              | 86         | 75.9 40.4                |       | 128.9          | 68.5         | 206        | 181.9          |                | 266        | 234.9          | 124.9          |
| 27<br>28         | 23.8 12.7<br>24.7 13.1 | 87<br>88   | 76.8 40.8<br>77.7 41.3   |       | 129.8<br>130.7 | 69.0<br>69.5 | 207        | 182.8          | 97.2<br>97.7   | 267        | 235.7          |                |
| 29               | 25.6 13.6              | 89         | 78.641.8                 |       | 131.6          |              | 208<br>209 | 183.7<br>184.5 |                | 268<br>269 | 236.6<br>237.5 |                |
| 30               | 26.5 14.1              | 90         | 79.5 42.9                |       | 132.4          | 70.4         | 210        | 185.4          | 98.6           | 270        | 238.4          |                |
| 31               | 27.4 14.6              | 91         | 80.3 42.7                | 151   | 133.3          | 70.9         | 211        | 186.3          | 99.1           | 271        |                | 127.2          |
| 32<br>33         | 28.3 15.0<br>29.1 15.5 | 92         | 81.243,2<br>82.143.7     |       | 134.2<br>135.1 | 71.4         | 212        | 187.2          |                | 272        |                | 127.7          |
| 34               | 30.0 16.0              | 94         | 83.0 44.1                |       | 136.0          | 71.8<br>72.3 | 213<br>214 | 189.0          | 100.0          | 273<br>274 | 241.0<br>241.9 |                |
| 35               | 30.9 16.4              | 95         | 83.9 44.6                | 155   | 136.9          | 72.8         | 215        | 189.8          | 100.9          | 275        | 242.8          | 129.1          |
| 36<br><b>3</b> 7 | 31.8 16.9<br>32.7 17.4 | 96<br>97   | 84.8 45.1<br>85.6 45.5   | 156   | 137.7          | 78.2         | 216        | 190.7          |                | 276        | 243.7          |                |
| 38               | 33.6 17.8              | 98         | 86.5 46.0                |       | 138.6<br>139.5 | 73.7<br>74.2 | 217<br>218 |                | 101.9<br>102.3 | 277        | 244.6<br>245.5 |                |
| 39               | 34.4 18.9              | 99         | 87.4 46.5                | 159   | 140.4          | 74.6         | 219        |                | 102:8          | 279        |                | 131.0          |
| 40               | 35.3 18.8              | 100        | 88.3 46.9                | 160   | 141.3          | 75.1         | 220        | 194,2          | 103.3          | 280        | 247.2          | 131.5          |
| 41<br>42         | 36.2 19.2<br>37.1 19.7 | 101        | 89.2 47.4                |       | 142.2          | 75.6         | 221        |                | 103.8          | 281        | 248.1          |                |
| 43               | 38.0 20.2              | 102<br>103 | 90.1 47.9<br>90.9 48.4   |       | 143.0          | 76.1<br>76.5 | 222<br>223 | 196.0<br>196.9 |                | 282<br>283 | 249.0<br>249.9 |                |
| 44               | 38.8 20.7              | 104        | 91.8 48.8                |       | 144.8          | 77.0         | 224        |                | 105.2          | 284        |                | 133.3          |
| 45<br>46         | 39.7 21.1<br>40.6 21.6 | 105        | 92.7 49.9                |       | 145.7          | 77.5         | 225        | 198.7          | 105.6          | 285        | 251.6          | 133.8          |
| 47               | 41.5 22.1              | 106<br>107 | 93.6 49.8<br>94.5 50.2   |       | 146.6<br>147.5 | 77.9<br>78.4 | 226        | 199.5          |                | 286        |                | 134.3          |
| 48               | 42.4 22.5              | 108        | 95.4 50.7                |       | 148.3          |              | 227<br>228 |                | 106.6<br>107.0 | 287        |                | 134.7<br>135.2 |
| 49<br>50         | 43.3 23.0              | 109        | 96.2 51.9                | 169   | 149.2          | 79.3         | 229        | 202.2          | 107.5          | 289        | 255.2          | 135.7          |
|                  | 44.1 23.5              | 110        | 97.1 51.6                | l     | 150.1          | 79.8         | 230        |                | 108.0          | 290        | 256.1          | 136.1          |
| 51<br>52         | 45.0 23.9<br>45.9 24.4 | 111<br>112 | 98.052.1<br>98.952.6     |       | 151.0<br>151.9 |              | 231        |                | 108.4<br>108.9 | 291        | 256.9          | 136.6          |
| 53               | 46.8 24.9              | 113        | 99.853.1                 |       | 151.9          |              | 232<br>233 |                | 108.9          |            | 257.8<br>258.7 |                |
| 54               | 47.7 25.4              | 114        | 100.7 53.5               | 174   | 158.6          | 81.7         | 294        |                | 109.9          | 294        | 259.6          |                |
| 55<br>56         | 48.6 25.8<br>49.4 26.3 | 115        | 101.554.0                | 11    | 154.5          | 82.2         | 235        | 207.5          | 110.3          | 295        | 260.5          | 158.5          |
| 57               | 50.3 26.8              | 116<br>117 | 102.4 54.5<br>103.8 54.9 |       | 155.4<br>156.3 | 82.6<br>83.1 | 236<br>237 |                | 110.8<br>111.3 | 296<br>297 |                | 139.0<br>139.4 |
| 58               | 51.2 27.2              | 118        | 104.2 55.4               | 178   | i57.2          |              |            |                | 111.7          | 298        | 263.1          |                |
| 59<br>60         | 52.1 27.7<br>53.0 28.2 | 119<br>120 | 105.155.9                | 179   | 158.0          | 84.0         | 239        | 211.0          | 112.2          | 299        | 264.0          | 140.4          |
| Dist.            |                        |            | 106.0 56.5               | 11    | 158.9          | 1 1          |            | 211.9          |                | 300        | 264.9          |                |
|                  | Dep. D.Lat             | II 1218E.  | r meh. miai              |       |                |              | Dist.      | Dep.           | D.Lati         | Dist.      | ı Dep.         | I D.Lat        |
|                  |                        |            |                          |       | 52 Deg         | cces.        |            |                |                |            |                |                |

TABLE XIII.

| _        |              |            |            |                |              | 2          | 9 Deg          | rees.        |            |                |                |            |                |        |
|----------|--------------|------------|------------|----------------|--------------|------------|----------------|--------------|------------|----------------|----------------|------------|----------------|--------|
| Dist.    | D.Lat        | Dep.       | Dist.      | D.Lat          | Dep.         | Dist.      | DLat           | Dep.         | Dist.      | D.Lat          | Dep.           | Dist.      | D.Lat          | Dep.   |
| 1        | 0.9          | 0.5        | 61         | 58.4           | 29.6         | 121        | 105.8          | 58.7         | 181        | 158.3          | 87.8           | 241        | 210.8          | 116.8  |
| 2        | 1.7          |            | 62         | 54.2           |              | 122        | 106.7          | 59.1         | 182        | 159.2          | 88.2           | 242        | 211.7          |        |
| 3        | 2.6          |            | 63         | 55.1           |              | 123        | 107.6          |              | 183,       |                | 88.7           | 243        | 212.5          |        |
| 4<br>5   | 3.5<br>4.4   |            | 64<br>65   | 56.0<br>56.9   |              | 124<br>125 | 108.5          | 60.1<br>60.6 | 184<br>185 | 160.9<br>161.8 | 89.2<br>89.7   | 244<br>245 | 213.4<br>214.3 |        |
| 6        | 5.2          | 2.9        | 66         | 57.7           |              | 126        | 110.2          |              | 186        | 162.7          | 90.2           | 246        | 215.2          |        |
| 7        | 6.1          | 3.4        | 67         | 58.6           |              | 127        | 111.1          | 61.6         | 187        | 163.6          | 90.7           | 247        | 216.0          |        |
| 8        | 7.0          |            | 68         | 59.5           | 33.0         | 128        | 112.0          |              | 188        | 164.4          |                | 248        | 216 9          |        |
| 9        | 7.9          | 4.4        | 69         | 60.3           |              | 129        | 112.8          |              | 189        | 165.3          |                | 249        | 217.8          |        |
| 10       | 8.7          | 4.8        | 70         | 61.2           | 33.9         | 130        | 113.7          | 63.0         | 190        | 166.2          | 92.1           | 250        | 218.7          | 121.2  |
| 11       | 9.6          | 5.3        | 71         | 62.1           | 34.4         | 131        | 114.6          | 63.5         | 191        | 167.1          | 92.6           | 251        | 219.5          | 121.7  |
| 12       | 10.5         | 5.8        | 72         |                | 34.9         | 132        | 115.4          | 64.0         | 192        | 167.9          |                | 252        | 220.4          |        |
| 13       | 11.4         |            | 78         | 63.8           |              | 133        | 116.3<br>117.2 | 64.5         | 193        | 168.8          | 93.6           | 253        | 221.3          |        |
| 14       | 12.2<br>13.1 | 6.8<br>7.3 | 74<br>75   | 64.7           |              | 134        | 118.1          | 65.0<br>65.4 | 194<br>195 | 169.7<br>170.6 | 94.1<br>94.5   | 254<br>255 | 222.2<br>223.0 |        |
| 16       | 14.0         | 7.8        | 76         | 66.5           |              | 136        | 118.9          |              | 196        | 171.4          |                |            | 223.9          |        |
| 17       | 14.9         | 8.2        | 77         | 67.3           |              | 137        | 119.8          | 66.4         | 197        | 172.3          |                | 257        | 224,8          |        |
| 18       | 15.7         |            | 78         |                | 37.8         | 138        | 120.7          | 66.9         | 198        | 173.2          |                | 258        | 225.7          |        |
| 19       | 16.6         | 9.2        | 79         |                | 38.3         | 139        | 121.6          |              | 199        | 174.0          |                |            | 226,5          |        |
| 20       | 17.5         | 9.7        | 80         | 70.0           | 38.8         | 140        | 122.4          | 67.9         | 200        | 174.9          | 97.0           | 260        | 227.4          | 126.1  |
| 21       |              | 10.2       | 81         | 70.8           |              | 141        | 123.9          |              | 201        | 175.8          |                |            | 228.3          |        |
| 22       | 19.2         |            | 82         | 71.7           |              | 142        | 124.2          | 68.8         | 202        | 176.7          |                | 262        | 229.2          |        |
| 23<br>24 | 20.1         | 11.2       | 83<br>84   | 72.6           |              | 143<br>144 | 125.1<br>125.9 | 69.3<br>69.8 | 203        | 177.5<br>178.4 |                | 263<br>264 | 230.0<br>230.9 |        |
| 25       | 21.0         |            | 85         | 74.3           |              | 145        | 126.8          | 70.3         | 205        | 179.3          |                |            | 231.8          |        |
| 26       | 22.7         |            | 86         | 75.2           |              | 146        | 127.7          | 70.8         | 206        | 180,2          |                | 266        | 232.6          |        |
| 27       | 23.6         |            | 87         | 76.1           |              | 147        | 128.6          | 71.3         | 207        |                | 100,4          |            | 233.5          | 129.4  |
| 28       | 24.5         |            | 88         | 77.0           |              | 148        | 129.4          | 71.8         |            | 181.9          |                | 268        | 234.4          |        |
| 29       | 25.4         |            | 89         | 77.8           |              | 149        | 130.3          | 72.2         | 209        |                | 101.8          | 269        | 235.5          |        |
| 30       | 26.2         | 14.5       | 90         | 78.7           | 43.6         | 150        | 131.2          | 72.7         | 210        | 185.7          | 101.8          | 270        | 286.1          | 130.9  |
| 31       | 27.1         |            | 91         | .79.6          |              | 151        | 132.1          | 73.2         | 211        |                | 102.3          | 271        | 237,0          | 131.4  |
| 32       | 28.0         |            | 92         | 80.5           |              | 152        | 132.9          |              | 212        |                | 102.8          | 272        | 237,9          | 131.9  |
| 33<br>34 | 28.9<br>29.7 |            | 93<br>94   | 81.3<br>82.2   |              | 153<br>154 | 133.8<br>134.7 | 74.2         | 213<br>214 |                | 103.3<br>103.7 | 273        | 238.8<br>239.6 |        |
| 35       | 30.6         |            | 95         | 83.1           |              | 155        | 135.6          |              | 215        |                | 104.2          |            | 240.5          |        |
| 36       | 31.5         |            | 96         | 84.0           |              | 156        | 136.4          |              | 216        |                | 104.7          | 276        | 241.4          |        |
| 37       | 32.4         |            | 97         |                | 47.0         | 157        | 137.3          | 76.1         | 217        |                | 105.2          | 277        | 242.3          |        |
| 38       | 33.2         |            | 98         |                | 47.5         | 158        | 138.2          | 76.6         | 218        |                | 105.7          |            | 243.1          |        |
| 39<br>40 | 34.1<br>35.0 |            | 100        | 85.5           | 43.0         | 159<br>160 | 139.1<br>139.9 | 77.1         | 219<br>220 |                | 106.2<br>106.7 |            | 244.0<br>244.9 |        |
|          |              |            | -          |                | !            |            |                |              |            | !              | <u> </u>       |            |                |        |
| 41 42    | 35.9         |            | 101        |                | 49.0         | 161        | 140.8          | 78.1         | 221        |                | 107.1          | 281        | 245.8          |        |
| 43       | 36.7<br>37.6 | 20.8       | 102        | 89.2           | 49.5<br>49.9 | 162<br>163 | 141.7<br>142.6 | 78.5<br>79.0 | 222<br>223 |                | 107.6<br>103.1 | 282<br>283 | 246.6<br>247.5 |        |
| 44       | 38.5         |            | 104        | 91.0           |              | 164        | 143.4          |              | 224        |                | 108.6          | 284        | 248.4          |        |
| 45       | 39.4         | 21.8       | 105        |                | 50.9         | 165        | 144.3          | 80.0         | 225        | 196.8          | 109.1          | 285        | 249.3          | 138.2  |
| 46       | 40.2         |            | 106        |                | 51.4         | 166        | 145.2          |              | 226        |                | 109.6          | 286        | 250.1          |        |
| 47<br>48 | 41.1         |            | 107        | 93.6           |              | 167        | 146.1          | 81.0         | 227        |                | 110.1          | 287        | 251,0          |        |
| 49       | 42.0<br>42.9 |            | 108<br>109 | 94.5           |              | 168<br>169 | 146.9<br>147.8 | 81.4         | 228<br>229 |                | 110.5<br>111.0 | 288<br>289 | 251.9<br>252.8 |        |
| 50       | 43.7         |            | 110        |                | 53.3         |            | 148.7          | 82.4         | 230        |                | 111.5          | 290        | 253.6          |        |
| 51       |              |            |            |                |              |            | 149.6          | 82.9         |            |                |                |            |                |        |
| 52       | 44.6<br>45.5 |            | 111        | 97.1           | 53.8<br>54.3 | 171<br>172 | 150.4          | 1            | 231        |                | 112.0<br>112.5 | 291<br>292 | 254.5<br>255.4 | 141.1  |
| 53       | 46.4         |            | 113        | 98.8           |              |            | 151.3          |              | 233        | 203.8          |                |            | 256.3          |        |
| 54       | 47.2         | 26.2       | 114        | 99 7           | 55.3         | 174        | 152.2          | 84.4         | 234        | 204.7          | 113.4          | 294        | 257.1          | 142.5  |
| 55       | 48.1         |            | 115        | 100.6          |              | 175        | 153.1          |              | 235        |                | 113.9          |            | 258.0          |        |
| 56<br>57 | 49.0         |            |            | 101.5          |              |            | 153.9          |              | 236        |                | 114.4          |            | 258.9          |        |
| 58       | 49.9<br>50.7 |            |            | 102.3<br>103.2 |              | 177<br>178 | 154.8<br>155.7 |              | 237<br>238 |                | 114.9<br>115.4 |            | 259.8<br>260.6 |        |
| 59       | 51.6         |            | 119        | 104.1          | 57.7         |            | 156.6          | 86.8         | 239        |                | 115.9          |            | 261.5          |        |
| 60       | 52.5         |            | 120        | 105.0          |              |            | 157.4          |              | 240        |                | 116.4          |            | 262.4          |        |
| Dist.    | Den          | D.Lat      | Dist       | Den            | Dlat         | Dist       | Dep            | D.Lat        | Dist.      | Den            | 1).[ at        | Dist       | Dep.           | D.L.a. |
| ļ        | vP.          | _ ~at1     |            | ъер.           |              |            |                |              | ~ 4000     | - zep.         |                | ,          | ,P             | at     |
| <u></u>  |              |            |            |                |              | 6          | 1 Deg          | 1 662.       |            |                |                |            |                |        |

TABLE XIII.

' TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

|                  |  |              |            |       |                | S          | O Deg          | rees.        |            |                |                |            |                | 1     |  |
|------------------|--|--------------|------------|-------|----------------|------------|----------------|--------------|------------|----------------|----------------|------------|----------------|-------|--|
| Dist             | DLat   | Dep.         | Dist.      | D.Lat | Dep.           | Dist.      | D.Lat          | Dep.         | Dist.      | D.Lat          | Dep.           | Dist.      | D.Lat          | Dep.  |  |
| 1                | 0.9  | 0.5          | 61         | 52.8  |                | 121        | 104.8          | 60.5         | 181        | 156.8          | 90.5           | 241        | 208.7          |       |  |
| 2                | 1.7  | 1.0          | 62         |       | 31.0           | 122        | 105.7          | 61.0         | 182        | 157.6          |                |            | 209.6          |       |  |
| 8                | 2.6  | 1.5          | 63         | 54.6  |                | 123        | 106.5          | 61.5         | 188        | 158.5          | 91.5           | 243<br>244 | 210.4          |       |  |
| 4 5              | 3.5<br>4.3   | 2.0<br>2.5   | 64<br>65   |       | $32.0 \\ 32.5$ | 124<br>125 | 107.4<br>108.3 | 62.0<br>62.5 | 184        | 159.5<br>160.2 | 92.0<br>92.5   | 244        | 212.2          |       |  |
| 6                | 5.2  | 3.0          | 66         |       | 33.0           | 126        | 109.1          | 63.0         | 186        | 161.1          | 93.0           | 246        | 213.0          |       |  |
| 7                | 6.1  | 3.5          | 67         |       | 33.5           | 127        | 110.0          | 63.5         | 187        | 161.9          | 93.5           | 247        | 213.9          | 123.5 |  |
| 8                | 6.9  | 4.0          | 68         |       | 34.0           | 128        | 110.9          | 64.0         | 188        | 162.8          | 94.0           | 248        | 214.8          |       |  |
| 9                | 7.8  | 4.5          | 69         |       | 34.5           | 129        | 111.7          | 64.5         | 189        | 163.7          | 94.5           | 249        | 215.6          |       |  |
| 10               | 8.7  | 5.0          | 70         | 60.6  | 35.0           | 130        | 112.6          | 65.0         | 190        | 164.5          | 95.0           | 250        | 216.5          |       |  |
| 11               | 9.5  | <b>5</b> .5  | 71         |       | 35.5           | 131        | 113.4          | 65.5         | 191        | 165.4          | 95.5           | 251        | 217.4          |       |  |
| 12               | 10.4   | 6.0          | 72         |       | 36.0           | 132        | 114.3          | 66.0         | 192        | 166.3          |                | 252        | 218.2<br>219.1 |       |  |
| 13               | 11.3<br>12.1   | 6.5<br>7.0   | 73<br>74   |       | 36.5<br>37.0   | 133        | 115.2<br>116.0 | 66.5<br>67.0 | 193        | 167.1<br>168.0 |                |            | 220.0          |       |  |
| 14<br>15         | 13.0   | 7.5          | 75         |       | 37.5           | 135        | 116.9          | 67.5         | 194<br>195 | 168.9          |                | 255        | 220.8          |       |  |
| 16               | 13.9   | 8.0          | 76         |       | 38.0           | 136        | 117.8          | 68.0         | 196        | 169.7          |                | 11         | 221.7          |       |  |
| 17               | 14.7   | 8.5          | 77         |       | 38.5           | 137        | 118.6          | 68.5         | 197        | 170.6          | 98.5           | 257        | 222.6          |       |  |
| 18               | 15.6   | 9.0          | 78         |       | 39.0           | 138        | 119.5          | 69.0         |            | 171.5          |                |            | 223.4          |       |  |
| 19               | 16.5   | 9.5          | 79         |       | 39.5           | 139        | 120.4          | 69.5         | 199        | 172.3          |                |            | 224.3<br>225.2 |       |  |
| 20               | 17.3   | 10.0         | 80         | 69.3  | 40.0           | 140        | 121.2          | 70.0         | 200        | 173.2          | 100.0          | 260        |                |       |  |
| 21               | 18.2   | 10.5         | 81         |       | 40.5           | 141        | 122.1          | 70.5         | 201        |                | 100.5          | 261        | 226.0          |       |  |
| 22               | 19.1   | 11.0         | 82         |       | 41.0           | 142        | 123.0          | 71.0         | 202        |                | 101.0          |            | 226.9<br>227.8 |       |  |
| 23               | 19.9   | 11.5         | 83         |       | 41.5           | 148        | 123.8          | 71.5         | 203        |                | 101.5          | 263<br>264 | 227.6          | _     |  |
| 24<br>25         | 20.8<br>21.7   | 12.0<br>12.5 | 84<br>85   |       | 42.0<br>42.5   | 144        | 124.7<br>125.6 | 72.0<br>72.5 | 204<br>205 |                | 102.0<br>102.5 | 13         | 229.5          |       |  |
| 26               | 22.5   | 13.0         | 86         |       | 43.0           | 146        | 126.4          | 73.0         | 206        | 178.4          | 103.0          |            | 230.4          |       |  |
| 27               | 23.4   | 13.5         | 87         |       | 43.5           | 147        | 197.3          | 73.5         | 207        | 179.3          | 103.5          | 267        | 231.2          |       |  |
| 28               | 24.2   | 14.0         | 88         |       | 44.0           |            | 128.2          | 74.0         | 1          |                | 104.0          |            |                | 134.0 |  |
| 29               | 25.1   | 14.5         | 89         |       | 44.5           | 149        | 129.0          | 74.5         | 209        |                | 104.5          |            | 233.0<br>233.8 |       |  |
| 90               | 26.0   | 15.0         | 90         | 77.9  | 45.0           | 150        | 129.9          | 75.0         | 210        | .              | 105.0          |            |                |       |  |
| 31               | 26.8   | 15.5         | 91         |       | 45.5           | 151        | 133.8          | 75.5         | 211        |                | 105.5          | 271        | 234.7          |       |  |
| 32               | 27.7   | 16.0         | 92         |       | 46.0           | 152        | 151.6          | 76.0         | 212        | 183.6          | 106.0          | 272        | 235.6          |       |  |
| 33               | 28.6   | 16.5         | 93         |       | 46.5           | 153        | 132.5          | 76.5         | 213        | 184.5          | 106.5          | 273<br>274 | 236.4<br>237.3 |       |  |
| 94<br><b>5</b> 5 | 29.4<br>30.3   | 17.0<br>17.5 | 94<br>95   |       | 47.0 $47.5$    | 154        | 133.4<br>134.2 | 77.0<br>77.5 | 214        |                | 107.0          | ll         | 238.2          |       |  |
| 36               | 31.2   | 18.0         | 1          |       | 48.0           | 156        | 135.1          | 78.0         | 216        |                | 108.0          |            |                | 138.0 |  |
| 37               | 32.0   | 18.5         |            |       | 48.5           | 157        | 136.0          | 78.5         | 217        | 187.9          | 108.5          | 277        | 239.9          |       |  |
| 38               | 32.9   | 19.0         | 4          |       | 49.0           |            | 136.8          | 79.0         | 218        |                | 109.0          |            | 240.8          |       |  |
| 39               | 39     33.8     19.5     99     85.7     49.5     159     137.7     79.5     219     189.7     109.5     279     241.6     155       40     34.6     20.0     100     86.6     50.0     160     138.6     80.0     220     190.5     110.0     280     242.5     140.0 |              |            |       |                |            |                |              |            |                |                |            |                |       |  |
| 40               | 40 34.6 20.0 100 86.6 50.0 160 138.6 80.0 220 190.5 110.0 290 242.5 140  |              |            |       |                |            |                |              |            |                |                |            |                |       |  |
| 41               | 35.5   | 20.5         | 101        |       |                | 161        | 139.4          |              | 221        |                |                |            |                |       |  |
| 42               | 36.4   | 21.0         | 102        |       | 51.0           | 162        | 140.3          | 81.0         | 222        |                | 111.0          |            | 244.2          |       |  |
| 43               | 37.2   | 21.5         | 103<br>104 |       | 51.5           | 163        | 141.9<br>142.0 | 81.5         | 223<br>224 |                | 111.5<br>112.0 | 283<br>284 | 245.1<br>246.0 |       |  |
| 44<br>45         | 38.1<br>39.0   | 22.0<br>22.5 | 104        |       | 52.0<br>52.5   | 164<br>165 | 142.0          | 82.0<br>82.5 | 224        |                | 112.5          |            | 246.8          |       |  |
| 46               | 39.8   | 23.0         | 106        |       | 53.0           | 166        | 143.8          | 83.0         | 226        |                | 113.0          |            | 247.7          | 143.0 |  |
| 47               | 40.7   | 23.5         | 107        |       | 53.5           | 167        | 144.6          | 83.5         | 227        | 196.6          | 113.5          | 287        | 248.5          |       |  |
| 48               | 41.6   | 24.0         | 108        | 93.5  | 54.↑           | 168        | 145.5          | 84.0         | 228        |                | 114.0          |            | 249.4          |       |  |
| 49               | 42.4   | 24.5         | 109        | 94.4  |                | 169        | 146.4          | 84.5         | 229        |                | 114.5          |            | 250.3          |       |  |
| 50               | 49.9   | 25.0         | 110        | 95.8  | 55.0           | 170        | 147.2          | 85.0         | 230        | ·              | 115.0          | 'i         | 251.1          |       |  |
| 51               | 44.2   | 25.5         | 111        |       | 55.5           | 171        | 148.1          | 85.5         | 231        | 200.1          | 115.5          | 291        | 252 O          |       |  |
| 52               | 45.0   | 26.0         |            |       | 56.0           |            | 149.0          | 86.0         | 232        | 200.9          | 116.0          | 292        | 252.9          | 146.0 |  |
| 58               | 45.9   |              | 113        |       | 56.5           |            | 149.8          |              | 233        | 201.8          | 116.5          | 293        | 253.7<br>254.6 | 140.5 |  |
| 54<br>55         | 46.8   |              | 114        |       | 57.0           |            | 150.7          |              |            | 202.6          | 117.5          | 294<br>295 | 255.5          |       |  |
| 56               | 47.6<br>48.5   |              | 116        | 100.5 | 57.5<br>58.0   | 175<br>176 | 152.4          |              | 236        | 204.4          | 118.0          | 296        | 256.3          |       |  |
| 57               | 49.4   |              | 117        | 101.3 |                | 177        | 153.3          |              | 237        | 205.2          | 118.5          | 297        | 257.2          |       |  |
| 58               | 50.2   | 29.0         | 118        | 102.2 |                | 178        | 154.2          | 89.0         | 238        | 206.1          | 119.0          | 298        | 258.1          | 149.0 |  |
| 59               | 51.1   |              | 119        | 103.1 |                | 179        | 155.0          |              | 239        |                | 119.5          |            | 258.9          |       |  |
| 60               | 52.0   | 30.0         | 120        | 103.9 | 60.0           | 180        | 155.9          | 90.0         | 240        |                | 120.0          | 300        | 259.8          |       |  |
| Dist.            | Dep.   | D.Lat        | Dist.      | Dep.  | D.lat          | Dist.      | Dep.           | D.Lat        | Dist.      | Dep.           | DLat           | Dist.      | Dep.           | D.Lat |  |
|                  |  |              |            |       |                |            | 0 Degr         |              |            |                | <del></del>    |            | <del></del>    |       |  |
|                  |  |              |            |       |                |            |                |              |            |                | - 7 :- :-      |            |                |       |  |

TABLE XIII.

TRAVERSE TABLE, TO EACH DEGREE OF THE QUADRANT.

31 Degrees. Dist. |D.Lat | Dep. Dist. |D. Lat |Dep. || Dist. |D. Lat | Dep. Dist. D. Lat Dep. Dep. Dist. D. Lat | 206.6 124.1 241 155.1 93.2 103.7 62.3 181 0.9 0.5 61 52.3 31.4 121 1 93.7 207.4 124.6 53.131.9 54.032.4 242 156.0 1.7 104.6 62.8 182 2 1.0 62 122 105.4 208.3 125.2 156.9 63.3 94.3 243 183 3 2.6 1.5 63 123 209.1 125.7 210.0 126.2 210.9 126.7 94.8 244 106.3 63.9 157.7 3.4 2.1 184 4 64 54.9 33.0 124 95.3 245 55.7 33.5 158.6 5 4.3 2.6 65 125 107.1 64.4 185 186 159.4 95.8 246 6 5.1 3.1 66 56.6 34.0 126 108.0 64.9 211.7 127.2 247 96.3 160.3 7 6.0 3.6 67 57.4 34.5 127 108.9 65.4 187 212.6 127.7 96.8 248 6.9 4.1 68 58.3 35.0 109.7 65.9 188 161.1 128 213.4 128.2 214.3 128.8 97.3 249 7.7 4.6 110.6 66.4 189 162.0 9 69 59.1 35.5 129 162.9 97.9 250 10 8.6 5.2 70 60.0 36.1 130 111.4 67.0 190 163.7 98.4 164.6 98.9 165.4 99.4 166.3 99.9 215.1 129.3 251 60.936.6 11 9.4 5.7 71 131 1112.3 67.5 191 216.0129.8 252 113.1 68.0 192 10.3 6.2 72 61.7 37.1 132 12 216.9 130.3 253 114.0 68.5 6.7 73 193 13 11.1 62.6 37.6 133 217.7 130.8 254 63.438.1 64.338.6 65.139.1 69.0 14 12.0 7.2 74 134 114.9 194 218.6 131.3 167,1 100.4 255 7.7 69.5 195 75 115.7 15 12.9 135 219.4 131.8 220.3 132.4 70.0 168.0 100.9 256 116.6 196 13.7 8.2 76 16 136 168.9 101.5 169.7 102.0 170.6 102.5 257 70.6 8.8 66.0 39.7 17 14.6 77 137 117.4 197 221.1 132.9 258 198 9.3 18 15.4 78 66.9 40.2 138 118.3 71.1 222.0133.4 259 67.7 40.7 68.6 41.2 9.8 119.1 199 19 16.3 79 139 71.6 222.9 133.9 171.4 103.0 260 20 17.1 10.3 80 140 72.1 200 223.7 134.4 120.9 72.6 121.7 73.1 10.8 69.4 11.7 70.3 42.2 71.1 42.7 201 172.3 103.5 261 21 18.0 81 141 224.6 134.9 225.4 135.5 173.1 104.0 262 11.3 82 142 202 22 18.9 174.0 104.6 263 11.8 122.6 73.7 203 23 19.7 83 143 226.3 136.0 174.9 105.1 175.7 105.6 264 24 20.6 12.4 84 72.0 43.3 144 123.4 74.2 204 227.1 136.5 124.3 74.7 125.1 75.2 126.0 75.7 265 25 12.9 85 72.9 43.8 205 21.4 145 228.0 137.0 73.7 44.3 74.6 44.8 176.6 106.1 266 26 22.3 13.4 86 206 146 228.9 137.5 177.4 106.6 267 13.9 27 23.1 87 147 207 229.7 138.0 230.6 138.5 268 28 24.0 14.4 88 75.4 45.3 76.2 208 178.3 107.1 148 126.9 269 127.7 76.7 179.1 107.6 29 14.6 89 76.3 45.8 209 24.9 149 231.4 139.1 180.0 108.2 270 30 15.5 210 25.7 90 77.1 46.4 150 128.6 77.3 232.3 139.6 129.4 77.8 180.9 108.7 271 31 26.6 16.0 91 78.0 46.9 211 151 272 233.1 140.1 32 27.4 16.5 92 78.9 47.4 152 130.3 78.3 212 181.7 109.2 78.8 234.0 140.6 17.0 79.7 47.9 80.6 48.4 213 182.6 109.7 273 33 28.3 93 153 181.1 234.9 141.1 17.5 214 183.4 110.2 274 34 29.1 9·1 95 132.0 79.3 154 235.7 141.6 275 18.0 81.4 48.9 79.8 215 184.3 110.7 35 30.0 155 132.9 236.6 142.9 185.1 111.2 276 36 18.5 96 80.3 216 50.9 82.3 49.4 156 133.7 237.4 142.7 83.1 50.0 186.0111.8 277 37 19.1 97 80.9 217 31.7 157 134.6 84.0 50.5 84.9 51.0 85.7 51.5 278 238.3 143.2 38 32.6 19.6 98 81.4 218 186.9112.3 158 135.4 239.1 143.7 81.9 279 39 20.1 219 187.7112.8 99 33.4 159 136.3 34.3 20.6 280 240.0 144.2 137.1 82.4 188.6113.3 40 100 2.0 160 240.9 144.7 241.7 145.2 281 86.6 52.0 41 82.9 221 189.4113.8 35.1 21.1 101 161 138.0 282 190.3 114.3 87.4 52.5 138.9 83.4 222 42 36.0 21.6 102 162 84.0 242.6 145.8 283 43 22.1 103 88.3 53.0 223 191.1 114.9 36.9 163 13977 89.1 53.6 90.0 54.1 90.9 54.6 91.7 55.1 37.7 38.6 284 243.4 146.3 192.0 115.4 44 22.7 104 164 140.6 84.5 141.4 85.0 224 285 244.8 146.8 192.9 115.9 45 23.2 105 165 225 245.1 147.3 142.3 85.5 286 46 39.4 23.7 106 226 193.7 116.4 166 246.0 147.8 287 47 40.3 24.2 107 86.0 227 194.6 116.9 167 143.1 246.9 148.3 288 48 24.7 108 86.5 228 195.4 117.4 41.1 92.6 55.6 168 144.0 247.7 148.8 42.0 25.2 42.9 25.8 49 109 93.4 56.1 94.3 56.7 144.9 87.0 229 196.3 117.9 289 169 248.6149.4 50 197.1 118.5 290 110 170 145.7 87.6 230 95.1 57.2 96.0 57.7 96.9 58.2 249.4149.9 51 198.0 119.0 291 111 88.1 231 43.7 26.3 171 146.6 250.3 150.4 147.4 88.6 292 52 112 232 198.9 119.5 44.6 26.8 172 251.2 150.9 252.0 151.4 252.9 151.9 253.7 152.5 293 53 45.4 27.3 113 148.3 89.1 233 199.7 120.0 173 200.6 120.5 54 97.7 58.7 294 46.3 27.8 114 149.1 89.6 234 174 201.4 121.0 295 55 47.1 28.3 48.0 28.8 115 98.6 59.2 175 150.0 90.1 235 296 99.4 59.7 100.3 60.3 56 116 90:6 236 202.3 121.5 176 150.9 117 297 254.6 153.0 57 151.7 91.2 237 203.1 122.1 48.9 29.4 177 101.1 60.8 298 255.4 153.5 204.0 122.6 49.7 29.9 118 178 152.6 91.7 238 256.3 154.0 299 59 30.4 119 102.061.3 179 153.4 92.2 239 204.9 123.1 120 154.3 92.7 240 205.7 123.6 300 257.1 154.5 51.4 80.9 102.961.8 180 Dist. Dep. D.Lat Dist. Dep. Dlat Dist. Dep. D. Lat Dist. Dep. D. Lat Dist. Dep. D. Lat Dist. Dep. D.Lat 59 Degrees.

#### MERIDIONAL PARTS.

| Tife    1819   1888   155   2008   2100   2171   2244   2318   2393   2468   2564   2602   2700   1   1715   1812   1890   1860   2008   2101   2173   2244   2319   2394   2470   2546   2602   2701   2   2   2   2   2   2   2   2   2  | М. | 28°           | 29°  | 30°  | 31°  | 32°   | 33°  | 34°  | 85°  | 36°    | 37°  | 38°  | 39°  | 40°  | 410  | M.    |
|--|----|---------------|------|------|------|-------|------|------|------|--------|------|------|------|------|------|-------|
| 1 1752 1821 1890 1850 2850 2810 2110 2178 2246 2319 2394 2470 2546 2624 2705 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   | 0  | 1751          | 1819 | 1888 | 1958 | 2028  | 2100 | 2171 | 2244 | 2318   | 2393 | 2468 | 2545 | 2623 | 2702 | 0     |
| 2         1755         1892         1891         1860         2031         2102         2174         2247         2346         2657         2704         24         2747         2546         2657         2704         24         2747         2546         2657         2705         2667         2705         2667         2705         2677         275         277         1895         1895         1865         2055         2055         2107         2179         2299         2325         2328         2399         2475         2551         2629         2716         2670         2717         275         2877         287         1896         66         2077         2108         2180         2325         2329         2404         2477         2555         2633         2711         0         2211         183         255         2329         2404         2471         2555         2633         2711         0         1776         183         1900         1971         2041         2111         2184         2265         2339         2406         2481         2555         2633         2711         0         0         2111         2184         2185         2450         2482         22579   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 3 1755   1829   1894   1895   1963   2083   2104   2176   2248   2329   2396   2479   2565   2668   2707   56         5 1757   1825   1894   1965   2085   2017   2178   2550   2329   2400   2476   2555   2669   2706   5         6 1758   1826   1895   1965   2085   2070   2179   2255   2329   2400   2476   2555   2659   2708   5         7 1759   1827   1836   1965   2085   2010   2181   2255   2329   2400   2476   2555   2659   2701   7         8 1760   1829   1889   967   2038   2010   2181   2255   2329   2400   2476   2555   2639   2711   7         8 1760   183   1899   1969   2039   2110   2189   2255   2329   2400   2478   2555   2639   2711   7         9 1761   183   1899   1969   2039   2110   2189   2255   2329   2400   2478   2555   2639   2711   7         10 1762   1831   1900   1971   2041   2111   2184   2257   2330   2405   2489   2557   2634   2714   9         10 1762   1831   1900   1971   2041   2111   2184   2257   2330   2405   2489   2557   2634   2714   9         10 1762   1831   1900   1971   2041   2111   2186   2259   2339   2406   2489   2557   2634   2714   9         10 1762   1831   1900   1971   2043   2114   2186   2259   2339   2406   2489   2559   2657   2716   10         11 12 1765   1833   1902   1973   2045   2116   2188   2261   2335   2410   2466   2469   2569   2664   2720   11         12 1765   1835   1905   1974   2045   2116   2188   2261   2335   2410   2466   2569   2664   2720   14         13 1766   1836   1907   1977   2047   2119   2191   2264   2338   2413   2489   2566   2644   2725   16         13 1766   1836   1907   1977   2047   2119   2191   2264   2338   2411   2487   2566   2644   2725   16         13 1766   1836   1907   1977   2047   2119   2191   2264   2338   2411   2487   2566   2644   2725   16         13 1767   1846   1915   1945   2050   2212   2192   2266   2340   2415   2491   2568   26  |    |               |      |      |      |       |      |      |      | 2320   |      |      |      |      |      |       |
| 4 1756 1894 1895 1964 2063 2104 2176 2249 2329 2398 2475 2550 2688 2707 4 5 1757 1895 1896 1964 2064 2105 2178 2252 2352 2400 2476 2555 2653 2669 2708 6 1758 1892 1898 1965 2035 2107 2179 2552 2352 2400 2476 2555 2653 2710 6 7 1759 1897 1896 1966 2075 2108 2180 2554 2398 2405 2478 2555 2632 2711 0 8 1760 1892 1899 1967 2038 2109 2181 2554 2398 2405 2478 2555 2632 2711 0 10 1762 1893 1990 1971 2401 2118 2184 2257 2390 2405 2489 2557 2634 2714 0 11 1764 1893 1990 1971 2401 2118 2185 2256 2393 2406 2489 2557 2634 2715 10 11 1764 1893 1900 1973 2404 2115 2187 2950 2334 2409 2485 2559 2897 2716 11 12 1765 1893 1905 1973 2044 2115 2187 2950 2334 2409 2485 2559 2897 2716 11 13 1766 1894 1908 1973 2044 2115 2187 2950 2334 2409 2485 2652 2640 2719 13 14 1767 1893 1905 1974 2045 2116 2188 2261 2393 2406 2485 2562 2640 2719 13 15 1768 1894 1900 1979 2045 2110 2189 2265 2391 2410 2487 2664 2462 2722 14 16 1769 1899 1908 1978 2045 2110 2192 2264 2338 2410 2486 2663 2640 2729 14 18 1772 1840 1909 1979 2050 2121 2199 2266 2340 2415 2499 2566 2644 2722 14 18 1778 1840 1910 1980 2051 2122 2194 2266 2340 2415 2499 2566 2646 276 18 1777 1844 1910 1990 2051 2122 2194 2268 2391 2416 2499 2566 2646 276 18 1777 1846 1915 1995 2056 2127 2199 2772 2345 2409 2405 2406 2663 2464 2729 18 20 1777 1846 1841 1910 1986 2057 2128 2209 2272 2346 2429 2498 2571 2649 278 18 21 1776 1845 1914 1986 2056 2127 2199 2272 2346 2429 2498 2571 2649 278 18 21 1776 1846 1915 1985 2056 2127 2199 2272 2346 2429 2498 2571 2649 278 18 21 1776 1846 1915 1985 2056 2127 2199 2272 2346 2429 2498 2571 2649 278 18 21 1776 1846 1915 1985 2056 2127 2199 2272 2346 2429 2498 2571 2649 278 18 21 1776 1846 1915 1985 2056 2127 2199 2272 2346 2429 2498 2571 2699 266 2484 2771 248 2490 2566 2648 2771 248 2490 2566 2648 2771 248 2490 2566 2648 2771 248 2490 2566 2648 2771 248 2490 2566 2648 2771 248 2490 2566 2648 2771 248 2490 2566 2648 2771 248 2490 2566 2648 2771 248 2490 2566 2648 2771 248 2490 2566 2648 2771 248 2490 2566 2648 2771 248 2490 2566 2648 2771 248 2490 2566 2 |    |               | 1823 |      | 1962 | 2032  | 2103 | 2175 | 2248 | 2322   | 2396 | 2472 | 2549 | 2627 | 2706 | 3     |
| 5 1757 1892 1894 1964 2064 2105 2178 2250 2394 2399 2400 2475 2551 2669 2708 5 6 1758 1892 1896 1965 2057 2108 2180 2253 2392 2400 2476 2553 2661 2710 2 9 1761 1831 1899 1969 3039 2110 2183 2255 2392 2401 2477 2554 2662 2711 7 10 1762 1831 1900 1970 2440 2111 2184 2257 2393 2406 2489 2557 2634 2714 9 10 1762 1831 1900 1970 2440 2111 2184 2257 2393 2406 2489 2557 2634 2714 9 11 1764 1832 1901 1971 2041 2118 2185 2558 2393 2406 2489 2557 2634 2714 9 11 1765 1833 1902 1972 2043 2114 2186 2259 2393 2406 2489 2559 2657 2716 11 12 1765 1833 1902 1972 2043 2114 2186 2259 2353 2408 2446 2560 2688 2718 11 13 1766 1834 1903 1973 3044 2116 2188 261 2358 2489 2459 2657 2716 11 14 1767 1835 1905 1974 2045 2116 2188 261 2355 2409 2449 2450 2658 2460 2713 14 14 1767 1835 1905 1974 2045 2116 2188 261 2355 2409 2419 2466 2658 2640 2719 11 15 1768 1838 1907 1977 2047 2119 2191 2964 2338 2410 2446 2560 2646 2725 16 17 1770 1839 1908 1978 2045 2121 2193 2266 2340 2415 2491 2668 2646 2726 18 18 1772 1840 1909 1979 2050 1212 2194 2268 2349 2415 2491 2668 2646 2726 18 18 1772 1840 1909 1979 2050 1212 2194 2268 2349 2415 2491 2668 2646 2726 18 19 1775 1846 1915 1985 2056 2127 2199 2270 2344 2419 2405 2567 2645 2729 2671 2710 2710 2710 2710 2710 2710 2710 27  |    |               |      |      |      | 2033  |      | 2176 | 2249 | 2323   | 2398 | 2473 | 2550 | 2628 | 2707 | 4     |
| 6   1758   1820   1895   1965   2035   2107   2179   2252   2352   2400   2476   2553   2651   2710   6   7   1750   1829   1889   1966   2037   2100   2181   2254   2328   2403   2478   2555   2633   2712   8   9   1761   183   1899   1969   2039   2110   2182   2255   2329   2405   2481   2558   2636   2714   9   1762   1831   1900   1971   2041   2113   2184   2357   2339   2406   2482   2559   2636   2715   1   1   1764   1833   1902   1971   2041   2113   2184   2357   2339   2406   2482   2559   2636   2715   1   1   1763   1833   1902   1972   2043   2114   2186   2258   2339   2406   2482   2559   2636   2715   1   1   1764   1834   1903   1973   2044   2115   2187   2260   2334   2409   2485   2569   2883   2718   2   1   1   1765   1834   1905   1974   2045   2116   2188   2360   2335   2410   2486   2569   2640   2719   1   1   1   1   1   1   1   1   1   |    |               |      |      |      |       |      | 2178 | 2250 | 2324   | 2399 |      |      |      | 2708 | 5     |
| 1760   |    |               |      |      |      | 2035  |      | 2179 | 2252 | 2325   | 2400 |      | 2558 | 2631 | 2710 | 6     |
| 8 1760 1893 1895 1967 2003 2109 2181 2254 2392 2403 2480 2557 2584 2712 8 9 1761 181 1899 1969 2039 2110 2183 2255 2392 2404 2480 2557 2584 2714 9 101 1762 1831 1900 1971 2041 2113 2185 2258 2332 2406 2482 2559 2658 2715 101 1764 1832 1901 1971 2041 2113 2185 2258 2332 2406 2482 2559 2687 2716 11 17 1764 1832 1903 1973 2044 211.5 2187 2950 2334 2409 2485 2560 2888 2718 12 13 1766 1834 1903 1973 2044 211.5 2187 2950 2334 2409 2485 2563 2640 2719 13 14 1767 1835 1905 1974 2045 2116 2188 2561 2338 2410 2486 2563 2584 2718 12 17 1770 1835 1905 1977 2047 2119 2191 2364 2338 2413 2486 2563 2563 2641 2720 14 17 1770 1839 1908 1978 2046 2117 2190 2263 2337 2411 2487 2563 2641 2720 14 17 1770 1839 1908 1978 2045 2120 2192 2266 2339 2414 2490 2567 2645 2734 17 18 1772 1840 1909 1979 2050 2121 2193 2366 2340 2415 2491 2568 2646 2726 18 1777 1846 1915 1985 2051 2122 2194 2268 2342 2416 2492 2569 2569 2644 2732 18 19 1773 1841 1910 1980 2051 2122 2194 2268 2342 2416 2492 2569 2569 2664 2737 18 18 19 18 19 18 2052 2122 2194 2268 2342 2416 2492 2573 2565 2673 273 173 18 18 19 18 1983 2053 2125 2197 2370 2374 2416 2492 2573 2565 2735 25 1777 1846 1915 1985 2056 2127 2199 2272 2346 2422 2498 2573 2565 2739 32 1777 1846 1915 1985 2056 2127 2199 2272 2346 2422 2498 2573 2565 2735 25 1778 1847 1916 1986 2057 2128 2200 2274 2348 2420 2496 2573 2565 2735 25 1778 1848 1918 1988 2055 2131 220 2274 2349 2424 2500 2577 2655 2735 25 1778 1848 1918 1988 2055 2131 220 2274 2349 2424 2500 2577 2655 2735 25 1778 1848 1918 1988 2055 2131 220 2274 2349 2424 2500 2577 2655 2735 25 1778 1846 1915 1985 2056 2127 2199 2272 2346 2422 2498 2573 2580 2588 2561 2773 18 18 18 18 19 18 19 18 2068 2137 209 2382 2350 2482 2504 2578 2580 2587 2735 25 1778 18 18 18 19 18 19 18 2068 2137 209 2382 2350 2482 2504 2578 2580 2587 2735 25 1778 18 18 18 18 19 18 19 18 2068 2137 2209 2382 2356 2432 2300 2578 2580 2588 2567 2735 25 178 18 18 18 18 19 18 19 18 2068 2137 2209 2382 2350 2432 2300 2580 2588 2567 2735 273 28 18 1788 1857 1997 1997 2067 2139 2212 2290 238 | 7  | 1759          | 1827 | 1896 | 1966 | 2007  | 2108 | 2180 | 2253 | 2327   | 2401 | 2477 | 2554 | 2632 | 2711 | 7     |
| 9 1761 188: 1899 1969 2039 2110 2182 2255 2329 2404 2480 2557 2684 2714 9 10 1762 1831 1900 1970 2343 2114 2184 2357 2330 2405 2481 2558 2636 2715 10 11 1764 1832 1901 1971 2041 2113 2185 2258 2333 2406 2482 2559 2637 2716 11 12 1765 1833 1902 1972 2043 2114 2186 2259 2333 2406 2482 2559 2637 2716 11 13 1766 1834 1903 1973 2044 2115 2187 29260 2334 2409 2485 2562 2640 2719 13 14 1767 1835 1905 1974 2045 2116 2188 261 2335 2410 2486 2563 2641 2720 11 15 1768 1837 1906 1076 2046 2117 2190 29263 2337 2411 2487 2564 2642 2722 15 16 1769 1838 1907 1977 2047 2119 2191 2564 2338 2415 2489 2566 2644 2723 16 17 1770 1839 1908 1978 2048 2120 2121 2193 2266 2349 2415 2490 2567 2645 2781 19 1773 1841 1910 1980 2051 2121 2193 2266 2342 2415 2491 2568 2648 2781 19 1775 1846 1914 1984 2054 2126 2198 2371 2345 2410 2490 2567 2645 2781 19 21 1776 1845 1914 1984 2054 2126 2198 2371 2345 2490 2496 2573 2651 2799 13 1777 1846 1915 1985 2055 2127 2199 2272 2346 2429 2496 2573 2651 2799 13 1777 1846 1916 1986 2057 2128 2200 2274 2348 2429 2496 2573 2651 2739 19 21 1776 1848 1917 1987 2056 2129 2292 2775 2349 2429 2496 2573 2651 2739 19 21 1776 1848 1917 1987 2056 2129 2292 2775 2349 2429 2496 2573 2651 2731 19 25 1780 1848 1917 1987 2056 2129 2292 2775 2349 2429 2496 2573 2651 2735 25 27 1789 1849 1918 1988 2059 2131 2203 2776 2354 2429 2490 2577 2565 2573 55 28 1781 1849 1918 1988 2059 2131 2203 2776 2350 2425 2501 2578 2657 2735 55 27 1789 1850 1992 2068 2134 2207 2870 2354 2429 2490 2577 2565 26735 57 28 1787 1856 1992 1992 2061 2132 2207 2280 2354 2429 2490 2573 2561 2773 57 28 1787 1856 1992 1991 2061 2133 2205 2776 299 2383 2418 2590 2577 2565 2663 2734 3 29 1788 1857 1977 1980 2000 2071 2143 2214 2207 2880 2354 2429 2500 2577 2565 2735 55 27 1789 1860 1992 1990 2062 2139 2207 2390 2393 2356 2432 2500 2580 2586 2735 2735 55 28 1780 1860 1992 1992 2002 2073 2144 2129 290 2939 2356 2449 2500 2580 2586 2737 275 56 24 1795 1861 1930 2000 2071 2149 2129 2290 2393 2356 2439 2509 2586 2777 275 56 24 1795 1861 1930 2000 2071 2149 2129 | 8  |               |      | 1898 | 1967 | 2038  | 2109 | 2181 | 2254 | 2328   | 2403 | 2478 | 2555 | 2633 | 2712 | 8     |
| 1762   | 9  |               | 183: | 1899 | 1969 | 2039  | 2110 | 2182 | 2255 | 2329   | 2404 | 2480 | 2557 | 2634 | 2714 | 9     |
| 11 1764 1892 1901 1971 2041 2118 2785 2258 2392 2406 2482 2550 2683 7716 11 12 1765 1884 1902 1972 2048 2114 2186 2259 2359 2385 2408 2484 2560 2888 2718 13 1766 1894 1905 1974 2045 2116 2188 2361 2334 2409 2486 2569 2641 2720 11 14 1767 1895 1905 1974 2045 2116 2188 2361 2335 2410 2486 2569 2641 2720 11 15 1768 1887 1906 1976 2046 2117 2190 29363 2337 2411 2487 2564 2649 2722 11 16 1769 1888 1907 1977 2047 2119 2191 2964 2338 2413 2489 2566 2644 2728 16 17 1770 1889 1908 1978 2045 2120 2192 2265 2389 2414 2490 2567 2667 2724 2724 17 18 1772 1840 1909 1979 2050 2121 2193 2366 2340 2416 2491 2569 2648 2779 17 18 1773 1841 1910 1980 2051 2122 2194 2268 2342 2416 2491 2569 2648 2771 18 19 1773 1844 1910 1980 2051 2122 2194 2268 2342 2416 2491 2569 2648 2771 17 17 1844 1914 1984 2054 2126 2198 2271 2345 2490 2496 2573 2651 2731 29 21 1776 1845 1914 1984 2054 2126 2198 2271 2345 2490 2496 2573 2651 2731 29 21 1776 1845 1914 1984 2054 2126 2198 2271 2345 2490 2496 2573 2651 2731 29 21 1776 1845 1914 1986 2057 2128 2200 2274 2346 2422 2498 2573 2651 2731 29 24 1778 1847 1916 1986 2057 2128 2200 2274 2346 2422 2498 2573 2651 2731 29 25 1780 1848 1917 1987 2056 2129 2292 2275 2349 2422 2499 2573 2651 2731 29 26 1781 1849 1918 1988 2059 2131 2205 2276 2394 2422 2496 2573 2651 2735 26 27 1782 1850 1992 1992 2063 2134 2200 2277 2351 2422 2200 2577 2552 5755 52 28 1785 1852 1991 1991 2061 2132 2004 2277 2351 2427 2503 2580 2658 2737 2735 248 |    |               |      |      | 1050 | 40.40 | 0111 | 0104 | 0055 | 0000   | 0405 |      |      |      |      |       |
| 1765   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      | 1     |
| 1766   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 1767   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 1768   1876   1876   1976   1976   2046   2117   2190   2263   2387   2411   2487   2564   2642   2723   17   1770   1889   1908   1978   2048   2100   2192   2265   2389   2414   2490   2567   2645   2724   17   1817   1840   1910   1950   2051   2122   2194   2266   2340   2415   2491   2568   2646   2724   17   1817   1818   1910   1950   2051   2122   2194   2266   2340   2415   2491   2568   2646   2724   17   1817   1818   1910   1950   2051   2122   2194   2266   2340   2415   2491   2568   2646   2724   17   1817   1818   1918   1988   2059   2125   2197   2270   2344   2419   2495   2579   2650   2729   17   1818   1918   1988   2059   2125   2197   2270   2344   2419   2455   2573   2650   2793   18   1771   1846   1915   1985   2066   2177   2199   2272   2346   2422   2498   2575   2653   2731   2345   2420   2498   2575   2653   2731   2345   2420   2498   2575   2653   2731   2345   2420   2498   2575   2653   2731   2345   2420   2498   2575   2653   2731   2345   2420   2498   2575   2653   2731   2345   2420   2498   2576   2654   2738   2427   2438      |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      | - 1   |
| 176  |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 1770   |    |               |      | 1906 |      |       |      |      |      |        |      |      |      |      |      |       |
| 1772   1840   1909   1979   2050   2121   2194   2266   2340   2415   2491   2568   2646   2726   1840   1910   1981   2052   2123   2194   2268   2342   2416   2492   2569   2648   2727   1920   1775   1841   1913   1983   2053   2125   2197   2270   2344   2419   2494   2571   2650   2729   2720   2720   2720   2344   2419   2494   2571   2650   2729   2720   2720   2344   2419   2495   2573   2650   2729   2720   2720   2344   2419   2495   2573   2650   2729   2720      |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 1773   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 200   1774   1842   1912   1981   2052   2125   2196   2269   2343   2418   2494   2571   2649   2728   2728   2776   1845   1914   1984   2054   2126   2198   2271   2345   2422   2498   2573   2651   2731   231   2777   1846   1915   1985   2056   2127   2199   2272   2346   2422   2498   2575   2653   2732   232   2477   1847   1916   1986   2057   2128   2200   2274   2348   2423   2499   2575   2653   2732   234   2251   2345   2422   2498   2575   2653   2732   234   2251   2345   2422   2498   2575   2653   2732   234   2250   2378   2655   2735   255   2657   2736   235     |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 1775   | 19 | 1778          | 1841 | 1910 | 1980 | 2051  | 2122 | 2194 | 2200 | 2372   | 2410 | 2492 | 2309 | 2040 | 2/2/ | 13    |
| 1   1775   | 20 | 1774          | 1842 | 1912 | 1981 | 2052  | 2123 | 2196 | 2269 | 2343   | 2418 | 2494 | 2571 | 2649 | 2728 | 20    |
| 22       1776       1845       1914       1984       2054       2126       2198       2271       2345       2420       2496       2573       2651       2731       22         24       1778       1847       1916       1986       2057       2128       2200       2274       2346       2422       2498       2575       2653       2738       23         25       1780       1848       1918       1988       2059       2131       2200       2274       2348       2422       2500       2577       2655       2735       228         26       1781       1850       1920       1990       2060       2132       2200       2277       2351       2427       2503       2580       2657       2736       26         27       1782       1855       1921       1991       2061       2133       2207       2280       2354       2204       2506       2581       2569       2739       28         29       1784       1853       1924       1993       2066       2135       2208       2281       2355       2430       2506       2581       2669       2739       2736       32  |    |               |      |      |      |       | 2125 | 2197 | 2270 | 2344   | 2419 | 2495 | 2572 | 2650 | 2729 | 21    |
| 23         1777         1846         1915         1985         2056         2127         2199         2272         2346         2422         2499         2575         2653         2732         2200           25         1780         1848         1917         1987         2058         2129         2202         2274         2348         2423         2499         2577         2655         2735         24           26         1781         1849         1918         1988         2059         2131         2203         2276         2350         2425         2501         2577         2655         2735         25           27         1782         1850         1921         1991         2061         2135         2205         2279         2351         2427         2503         2580         2681         2657         2736         29           29         1784         1853         1922         1992         2065         2137         2207         2250         2252         2250         2552         2561         2652         2749         20           31         1786         1855         1924         1994         2065         2137         2200   |    |               |      |      |      |       | 2126 | 2198 | 2271 | 2345   | 2420 | 2496 | 2573 | 2651 | 2731 | 22    |
| 24       1778       1847       1916       1986       2057       2128       2200       2274       2348       2423       2499       9.576       2654       2735       25         26       1781       1848       1918       1988       2059       2131       2202       2275       2349       2424       2500       2578       2655       2735       25         27       1782       1850       1920       1990       2060       2132       2204       2277       2351       2425       2501       2578       2652       2737       273       28         29       1784       1853       1922       1991       2063       2134       2207       2280       2351       2429       2502       2582       2661       2749       29         31       1785       1856       1925       1995       2065       2137       2209       2332       2356       2439       2508       2585       2663       2743       31         32       1787       1865       1925       1995       2067       2139       2211       2285       2439       2508       2585       2663       2743       31         31 <td></td> <td></td> <td></td> <td></td> <td></td> <td>2056</td> <td>2127</td> <td>2199</td> <td></td> <td>2346</td> <td>2422</td> <td>2498</td> <td>2575</td> <td>2653</td> <td>2732</td> <td>23</td>   |    |               |      |      |      | 2056  | 2127 | 2199 |      | 2346   | 2422 | 2498 | 2575 | 2653 | 2732 | 23    |
| 25         1780         1848         1917         1987         2058         2129         2202         2275         2349         2424         2500         2577         2655         2735         26           27         1782         1850         1920         1990         2060         2132         2204         2277         2351         2427         2503         2580         2658         2737         278           28         1783         1852         1921         1991         2061         2133         2205         2279         2353         2428         2504         2581         2659         2739         28           29         1784         1853         1922         1992         2063         2134         2207         2280         2351         2429         2505         2582         2661         2749         39           30         1786         1856         1925         1995         2066         2138         2210         2283         2358         2433         2509         2586         2663         2744         30           31         1786         1857         1927         2066         2138         2210         2283         2358  |    |               | 1847 |      | 1986 | 2057  | 2128 | 2200 |      | 2348   | 2423 | 2499 | 2576 | 2654 | 2738 | 24    |
| 1781   1849   1918   1988   2059   2131   2203   2276   2350   2425   2501   2578   2657   2736   2657   2736   2657   2736   2737   2737   2738   2838      |    |               |      |      |      | 2058  | 2129 | 2202 | 2275 | 2349   | 2424 | 2500 | 2577 | 2655 | 2735 | 25    |
| 27       1782       1850       1990       1990       2060       2192       2904       2277       2351       2427       2503       2503       2580       2658       2737       27         29       1784       1855       1921       1991       2063       2134       2207       2250       2254       2429       2505       2582       2661       2740       9         30       1785       1854       1929       1993       2064       2135       2208       2281       2355       2430       2506       2584       2662       2742       9         31       1786       1855       1925       1995       2066       2138       2210       2283       2358       2433       2509       2586       2662       2744       33         31       1789       1858       1928       1999       2066       2139       2211       2285       2359       2434       2509       2588       2666       2744       33         31       1790       1868       1928       1999       2070       2141       2212       2285       2359       2434       2513       2509       2667       2747       34 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>2131</td><td>2203</td><td>2276</td><td>2350</td><td>2425</td><td>2501</td><td>2578</td><td>2657</td><td>2736</td><td>26</td></t<>   |    |               |      |      |      |       | 2131 | 2203 | 2276 | 2350   | 2425 | 2501 | 2578 | 2657 | 2736 | 26    |
| 29         1784         1853         1992         1992         2063         2134         2207         2280         2354         2429         2505         2582         2661         2740         29           30         1785         1854         1923         1993         2064         2135         2208         2281         2355         2430         2506         2584         2662         2743         31           31         1786         1855         1924         1994         2065         2137         2209         2283         2358         2433         2509         2586         2665         2744         33           32         1787         1856         1925         1997         2067         2140         2213         2286         2359         2435         2510         2588         2666         2746         33           34         1790         1861         1930         2000         2071         2141         2214         2286         2360         2435         2512         2593         2667         2747         34           35         1791         1866         1930         2000         2072         2144         2216         2290   | 27 |               | 1850 | 1920 | 1990 | 2060  | 2132 | 2204 |      | 2351   | 2427 |      | 2580 | 2658 |      |       |
| 30   1785   1854   1929   1993   2064   2135   2208   2281   2355   2430   2506   2584   2662   2742   30   31   1786   1855   1924   1994   2065   2137   2209   2282   2356   2432   2508   2585   2665   2743   31   32   1787   1856   1925   1995   2066   2138   2210   2283   2358   2433   2509   2586   2665   2744   32   34   1790   1858   1928   1998   2065   2140   2213   2286   2369   2435   2512   2589   2667   2747   34   35   1791   1860   1929   1999   2070   2141   2214   2287   2361   2437   2513   2590   2667   2747   34   35   1792   1861   1930   2000   2071   2143   2215   2288   2363   2438   2514   2591   2670   2750   36   1792   1861   1930   2001   2072   2144   2216   2290   2364   2439   2515   2593   2671   2751   37   1865   1932   2001   2072   2144   2217   2291   2365   2440   2517   2593   2671   2751   37   38   1794   1868   1932   2002   2073   2145   2217   2291   2365   2440   2517   2593   2671   2751   39   1795   1864   1934   2004   2075   2146   2219   2292   2366   2442   2518   2595   2674   2754   39   2779   2775     | 28 | 1783          | 1852 | 1921 | 1991 | 2061  | 2133 |      |      |        |      | 2504 |      |      |      |       |
| 31 1786 1835 1924 1994 2065 2137 2209 2282 2356 2432 2508 2585 2663 2743 31 32 1787 1856 1925 1995 2066 2138 2210 2283 2358 2433 2509 2586 2665 2744 32 33 1789 1857 1927 1997 2067 2139 2211 2285 2359 2434 2510 2588 2666 2746 33 34 1790 1858 1928 1998 206c 2140 2213 2286 2360 2435 2512 2589 2667 2747 34 35 1791 1860 1929 1999 2070 2141 2214 2287 2361 2437 2513 2590 2669 2748 35 36 1792 1861 1990 2000 2071 2143 2215 2288 2363 2438 2514 2591 2667 2747 34 37 1793 1862 1931 2001 2072 2144 2216 2290 2364 2439 2515 2593 2671 2750 36 38 1794 1865 1992 2002 2073 2145 2217 2291 2365 2440 2517 2594 2673 2752 38 39 1795 1864 1934 2004 2075 2146 2219 2292 2366 2442 2518 2595 2674 2754 39 40 1797 1865 1935 2005 2076 2147 2220 2293 2368 2443 2519 2597 2675 2755 40 41 1798 1866 1936 2006 2077 2149 2221 2295 2369 2444 2521 2598 2676 2756 41 42 1799 1866 1937 2007 2078 2150 2222 2296 2370 2445 2522 2599 2678 2758 42 43 1800 1869 1938 2008 2079 2151 2224 2297 2371 2447 2523 2599 2679 2758 42 44 1801 1870 1939 2010 2080 2152 2225 2296 2370 2445 2522 2599 2678 2758 42 45 1802 1871 1941 2011 2082 2159 2226 2299 2374 2449 2526 2603 2682 2762 45 46 1803 1872 1942 2012 2083 2155 2227 2501 2375 2441 2523 2601 2679 2759 43 48 1800 1867 1938 2008 2079 2151 2224 2297 2371 2447 2523 2601 2679 2759 43 48 1800 1873 1943 2013 2084 2156 2228 2802 2376 2454 2522 2599 2680 2760 44 48 1803 1875 1944 2014 2085 2157 2230 2303 2376 2455 2529 2603 2682 2762 45 49 1807 1876 1945 2015 2086 2158 2231 2304 2379 2454 2551 2608 2687 2767 49 50 1808 1877 1946 2017 2038 2159 2232 2306 2380 2383 2458 2552 2600 2680 2770 55 51 1810 1879 1949 2019 2090 2162 2235 2308 2383 2458 2555 2610 2689 2770 55 51 1811 1880 1950 2020 2091 2163 2236 2309 2384 2455 2559 2610 2688 2766 45 55 1814 1888 1951 2021 2092 2164 2237 2311 2385 2461 2557 2614 2692 2772 55 54 1815 1881 1951 2021 2092 2164 2237 2311 2385 2461 2557 2614 2699 2770 55 55 1814 1888 1955 2025 2096 2167 2239 2313 2388 2468 2554 2620 2699 2779 58 55 1818 188 1897 1957 2027 2098 2169 2242 2316 2390 2466 2542 262 | 29 | 1784          | 1853 | 1922 | 1992 | 2063  | 2134 | 2207 | 2280 | 2354   | 2429 | 2505 | 2582 | 2661 | 2740 | 29    |
| 31 1786 1835 1924 1994 2065 2137 2209 2282 2356 2432 2508 2585 2663 2743 31 32 1787 1856 1925 1995 2066 2138 2210 2283 2358 2433 2509 2586 2665 2744 32 33 1789 1857 1927 1997 2067 2139 2211 2285 2359 2434 2510 2588 2666 2746 33 34 1790 1858 1928 1998 206c 2140 2213 2286 2360 2435 2512 2589 2667 2747 34 35 1791 1860 1929 1999 2070 2141 2214 2287 2361 2437 2513 2590 2669 2748 35 36 1792 1861 1990 2000 2071 2143 2215 2288 2363 2438 2514 2591 2667 2747 34 37 1793 1862 1931 2001 2072 2144 2216 2290 2364 2439 2515 2593 2671 2750 36 38 1794 1865 1992 2002 2073 2145 2217 2291 2365 2440 2517 2594 2673 2752 38 39 1795 1864 1934 2004 2075 2146 2219 2292 2366 2442 2518 2595 2674 2754 39 40 1797 1865 1935 2005 2076 2147 2220 2293 2368 2443 2519 2597 2675 2755 40 41 1798 1866 1936 2006 2077 2149 2221 2295 2369 2444 2521 2598 2676 2756 41 42 1799 1866 1937 2007 2078 2150 2222 2296 2370 2445 2522 2599 2678 2758 42 43 1800 1869 1938 2008 2079 2151 2224 2297 2371 2447 2523 2599 2679 2758 42 44 1801 1870 1939 2010 2080 2152 2225 2296 2370 2445 2522 2599 2678 2758 42 45 1802 1871 1941 2011 2082 2159 2226 2299 2374 2449 2526 2603 2682 2762 45 46 1803 1872 1942 2012 2083 2155 2227 2501 2375 2441 2523 2601 2679 2759 43 48 1800 1867 1938 2008 2079 2151 2224 2297 2371 2447 2523 2601 2679 2759 43 48 1800 1873 1943 2013 2084 2156 2228 2802 2376 2454 2522 2599 2680 2760 44 48 1803 1875 1944 2014 2085 2157 2230 2303 2376 2455 2529 2603 2682 2762 45 49 1807 1876 1945 2015 2086 2158 2231 2304 2379 2454 2551 2608 2687 2767 49 50 1808 1877 1946 2017 2038 2159 2232 2306 2380 2383 2458 2552 2600 2680 2770 55 51 1810 1879 1949 2019 2090 2162 2235 2308 2383 2458 2555 2610 2689 2770 55 51 1811 1880 1950 2020 2091 2163 2236 2309 2384 2455 2559 2610 2688 2766 45 55 1814 1888 1951 2021 2092 2164 2237 2311 2385 2461 2557 2614 2692 2772 55 54 1815 1881 1951 2021 2092 2164 2237 2311 2385 2461 2557 2614 2699 2770 55 55 1814 1888 1955 2025 2096 2167 2239 2313 2388 2468 2554 2620 2699 2779 58 55 1818 188 1897 1957 2027 2098 2169 2242 2316 2390 2466 2542 262 |    |               | 1000 | 1000 | 1000 |       | 0105 | 0000 | 0001 | 00 5 5 | 9490 | 0506 | 0504 | 0000 | 0749 | 90    |
| 32       1787       1836       1925       1995       2066       2138       2210       2283       2358       2433       2509       2586       2665       2744       32         38       1789       1857       1927       1997       2067       2139       2211       2285       2359       2434       2510       2588       2666       2746       33         34       1790       1858       1928       1999       2070       2141       2214       2287       2361       2437       2512       2589       2667       2747       34         35       1791       1860       1930       2000       2071       2143       2215       2288       2363       2438       2514       2591       2670       2750       36         37       1793       1862       1931       2001       2072       2144       2216       2290       2365       2449       2517       2594       2671       2751       38         39       1795       1866       1934       2004       2075       2146       2219       2292       2365       2440       2517       2594       2674       3753       39         40 <td></td>   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 33       1789       1357       1927       1997       2067       2139       2211       2285       2359       2434       2510       2588       2666       2746       33         34       1790       1858       1928       1998       2065       2140       2213       2286       2960       2435       2512       2589       2667       2747       34         35       1791       1860       1929       2070       2141       2214       2287       2961       2437       2512       2590       2669       2748       35         36       1792       1861       1930       2000       2071       2143       2215       2288       2363       2488       2511       2591       2670       2750       36         37       1795       1866       1931       2001       2072       2144       2216       2290       2364       2439       2515       2593       2671       2751       39         39       1795       1865       1935       2005       2076       2147       2220       2293       2366       2442       2512       2592       2673       2755       40         40       1797 <td></td>   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 34       1790       1858       1928       1998       206c       2140       2213       2286       2360       2435       2512       2589       2667       2747       34         35       1791       1860       1929       1999       2070       2141       2214       2287       2361       2437       2613       2590       2669       2748       35         36       1792       1861       1930       2000       2071       2143       2215       2288       2363       2438       2514       2591       2670       2750       36         37       1793       1862       1931       2001       2072       2144       2216       2290       2364       2499       2515       2593       2671       2751       37         38       1795       1864       1934       2004       2075       2146       2219       2292       2366       2440       2517       2594       2673       2754       39         40       1797       1865       1935       2005       2076       2147       2220       2293       2366       2443       2519       2579       2675       2755       40         41 <td></td>   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 55         1791         1860         1929         1999         2070         2141         2214         2287         2361         2437         2513         2590         2669         2748         35           36         1792         1861         1930         2000         2071         2143         2215         2288         2363         2438         2514         2591         2670         2750         36           37         1793         1862         1931         2001         2072         2144         2216         2290         2964         2439         2515         2593         2671         2750         36           38         1795         1864         1934         2004         2075         2146         2219         2292         2366         2440         2517         2594         2673         2752         38           40         1797         1865         1935         2005         2076         2147         2220         2293         2368         2442         2519         2597         2675         2755         40           41         1798         1866         1936         2006         2077         2149         2221         2295   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 86         1792         1861         1930         2000         2071         2143         2215         2288         2363         2438         2514         2591         2670         2750         36           37         1793         1862         1931         2001         2072         2144         2216         2290         2364         2439         2515         2593         2671         2751         37           38         1795         1863         1932         2002         2073         2145         2217         2291         2365         2440         2517         2594         2673         2752         38           99         1795         1866         1935         2005         2076         2147         2220         2293         2368         2443         2519         2577         2753         39           40         1797         1868         1937         2007         2078         2150         2222         2296         2370         2444         2521         2595         2676         2756         41           42         1799         1868         1937         2007         2078         2150         2222         2296         2370   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 37         1793         1862         1931         2001         2072         2144         2216         2290         2364         2439         2515         2593         2671         2751         37           38         1794         1868         1932         2002         2073         2145         2217         2291         2365         2440         2517         2594         2673         2752         38           99         1795         1866         1934         2004         2075         2146         2219         2292         2366         2442         2518         2595         2675         2754         39           40         1797         1865         1935         2005         2076         2147         2220         2293         2368         2443         2519         2567         2675         2755         41           41         1798         1866         1936         2006         2077         2149         2221         2295         2369         2444         2521         2598         2678         2755         41           42         1799         1868         1937         2007         2078         2150         2222         2299   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 38         1794         1868         1932         2002         2073         2145         2217         2291         2365         2440         2517         2594         2673         2752         38           39         1795         1864         1934         2004         2075         2146         2219         2292         2366         2442         2518         2595         2674         2754         39           40         1797         1865         1935         2005         2076         2147         2220         2293         2368         2443         2519         2597         2675         2756         41           41         1798         1866         1936         2006         2077         2149         2221         2295         2369         2444         2521         2598         2676         2756         41           42         1799         1868         1937         2007         2078         2150         2222         2296         2370         2444         2521         2599         2678         2756         41           43         1801         1871         1941         2011         2082         2153         2229         2372   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 39         1795         1864         1934         2004         2075         2146         2219         2292         2366         2442         2518         2595         2674         2754         39           40         1797         1865         1935         2005         2076         2147         2220         2293         2368         2443         2519         2597         2675         2755         40           41         1798         1866         1936         2006         2077         2149         2221         2295         2369         2444         2521         2598         2676         2756         41           42         1799         1866         1936         2007         2078         2150         2222         2296         2370         2445         2522         2599         2678         2758         42           43         1800         1869         1938         2008         2079         2151         2224         2297         2371         2447         2523         2601         2679         2759         43           44         1801         1871         1941         2011         2082         2153         2226         2299   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      | 1 . 1 |
| 40 1797 1865 1935 2005 2076 2147 2220 2293 2368 2443 2519 2597 2675 2755 40 11 1798 1866 1996 2006 2077 2149 2221 2295 2369 2444 2521 2598 2676 2756 41 12 1799 1868 1937 2007 2078 2150 2222 2296 2370 2445 2522 2599 2678 2758 42 43 1800 1869 1938 2008 2079 2151 2224 2297 2371 2447 2523 2601 2679 2759 43 44 1801 1870 1939 2010 2080 2152 2225 2298 2373 2448 2524 2602 2680 2760 44 45 1802 1871 1941 2011 2082 2153 2226 2299 2374 2449 2526 2603 2682 2762 45 46 1803 1872 1942 2012 2083 2155 2227 2301 2375 2451 2527 2604 2683 2763 46 47 1805 1875 1943 2013 2084 2156 2228 2802 2376 2452 2528 2606 2684 2764 47 1807 1876 1945 2015 2086 2157 2230 2903 2378 2459 2525 2606 2684 2764 47 1807 1876 1945 2015 2086 2158 2231 2304 2379 2454 2531 2608 2687 2767 49  50 1808 1877 1946 2017 2038 2159 2232 2306 2380 2456 2532 2610 2688 2768 50 1809 1878 1948 2018 2089 2161 2233 2307 2381 2457 2533 2611 2690 2770 51 52 1810 1879 1949 2019 2090 2162 2235 2308 2383 2458 2555 2612 2691 2771 52 53 1811 1880 1950 2020 2091 2163 2236 2309 2384 2459 2536 2614 2692 2772 53 54 1813 1881 1951 2021 2092 2164 2237 2311 2385 2461 2537 2615 2694 2774 54 55 1814 1883 1952 2022 2094 2165 2238 2312 2386 2463 2548 2556 2614 2692 2772 55 56 1815 1884 1953 2024 2095 2167 2239 2313 2385 2461 2537 2615 2694 2775 55 58 1817 1886 1956 2026 2097 2169 2242 2316 2390 2466 2542 2620 2699 2779 58 59 1818 1887 1956 2026 2097 2169 2242 2316 2390 2466 2542 2620 2699 2779 58   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 40         1798         1866         1996         2006         2077         2149         2221         2293         2369         2444         2521         2598         2676         2756         41           42         1799         1868         1997         2007         2078         2150         2222         2296         2370         2445         2522         2599         2678         2758         42           43         1800         1869         1938         2008         2079         2151         2224         2297         2371         2447         2523         2601         2679         2759         43           44         1801         1870         1939         2010         2080         2152         2225         2298         2378         2448         2524         2602         2680         2762         44           45         1803         1872         1942         2012         2083         2155         2227         2301         2376         2452         2528         2602         2684         2763         44           47         1805         1873         1943         2014         2085         2157         2230         2376   | 39 | 1793.         | 1004 | 1337 | 2001 | 2013  | 2110 |      |      |        |      |      | '    |      | !    |       |
| 42         1799         1868         1987         2007         2078         2150         2222         2296         2370         2445         2522         2599         2678         2758         42           43         1800         1869         1938         2008         2079         2151         2224         2297         2371         2447         2523         2601         2679         2759         43           44         1801         1870         1999         2010         2080         2152         2225         2298         2373         2448         2524         2602         2680         2762         45           45         1803         1871         1941         2012         2083         2155         2227         2301         2375         2451         2526         2603         2682         2762         45           46         1805         1873         1943         2013         2084         2156         2228         2802         2376         2452         2528         2604         2683         2764         48           48         1805         1875         1944         2014         2085         2157         2230         2903   | 40 | 1797          | 1865 | 1935 | 2005 | 2076  | 2147 |      |      |        |      |      |      |      |      |       |
| 43       1800       1869       1938       2008       2079       2151       2224       2297       2371       2447       2523       2601       2679       2759       43         44       1801       1870       1939       2010       2080       2152       2225       2288       2373       2448       2524       2602       2680       2760       44         45       1802       1871       1941       2011       2082       2153       2226       2299       2375       2449       2526       2603       2682       2762       45         46       1805       1875       1943       2013       2084       2156       2228       2302       2375       2452       2528       2604       2683       2763       46         48       1805       1875       1944       2014       2085       2157       2230       2903       2378       2452       2528       2606       2684       2766       48         49       1807       1876       1945       2015       2086       2158       2231       2304       2379       2454       2531       2606       2684       2766       48         50 <td>41</td> <td>1798</td> <td>1866</td> <td>1936</td> <td></td>   | 41 | 1798          | 1866 | 1936 |      |       |      |      |      |        |      |      |      |      |      |       |
| 44         1801         1870         1939         2010         2080         2152         2225         2298         2373         2448         2524         2602         2680         2760         44           45         1802         1871         1941         2011         2082         2153         2226         2299         2374         2449         2526         2603         2682         2762         45           46         1805         1872         1942         2012         2083         2155         2227         2901         2375         2452         2528         2604         2683         2763         46           47         1805         1875         1944         2014         2085         2157         2230         2903         2376         2452         2528         2606         2684         2764         47           48         1805         1875         1944         2014         2085         2157         2230         2903         2378         2452         2530         2607         2686         2766         48           49         1807         1876         1945         2017         2038         2159         2230         2300   | 42 | 17 <b>9</b> 9 | 1868 |      |      |       |      |      | 2296 |        |      |      |      |      |      |       |
| 45         1802         1871         1941         2011         2082         2153         2226         2299         2374         2449         2526         2603         2682         2762         45           46         1803         1872         1942         2012         2083         2155         2227         2901         2375         2451         2527         2604         2688         2763         46           47         1805         1875         1944         2014         2085         2157         2230         2303         2376         2452         2528         2606         2684         2764         47           48         1807         1876         1944         2015         2086         2157         2230         2303         2378         2452         2530         2607         2686         3766         48           49         1807         1876         1945         2015         2086         2158         2231         2304         2379         2454         2531         2608         2687         2767         49           50         1808         1877         1946         2017         2038         2159         2292         2306   |    |               |      |      |      |       |      |      | 2297 |        |      |      |      |      |      | 1 .   |
| 46         1803         1872         1942         2012         2083         2155         2227         2301         2375         2451         2527         2604         2683         2763         46           47         1805         1873         1943         2013         2084         2156         2228         2802         2376         2452         2528         2606         2684         2764         47           48         1805         1875         1944         2014         2085         2157         2230         2903         2378         2452         2528         2606         2684         2767         49           50         1808         1877         1946         2017         2038         2159         2292         2906         2380         2454         2531         2608         2687         767         49           50         1808         1877         1946         2017         2038         2159         2292         2906         2380         2456         2532         2610         2688         2768         767         49           50         1809         1876         1949         2019         2092         2162         2235   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 47         180.5         187.5         194.9         201.3         208.4         215.6         222.8         280.2         237.6         245.2         252.8         260.6         268.4         276.4         47           48         180.5         187.5         1944         2014         208.5         215.7         2230         2903         297.8         245.3         2590         2607         2686         2766         48           49         1807         1876         194.5         2015         208.6         215.8         2231         2304         2379         2454         2551         2608         268.7         276.7         49           50         1808         187.7         1946         201.7         2038         2159         2232         2306         2380         245.6         2532         2610         268.8         276.8         50           51         1809         187.8         1948         2018         2089         2161         2230         2807         2881         2457         2532         2610         268.8         276.8         51         51         181.7         1880         1950         2020         2091         2162         2235 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td></td<>   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      | 1     |
| 48       1803       1875       1944       2014       2085       2157       2230       2303       2378       2452       2530       2607       2686       3766       48         49       1807       1876       1945       2015       2086       2158       2231       2304       2379       2454       2531       2608       2687       2767       49         50       1808       1877       1946       2017       2038       2159       2232       2306       2880       2456       2532       2610       2688       2768       50         51       1809       1878       1948       2018       2089       2161       2233       2907       2881       2457       2539       2611       2690       2770       51         52       1810       1879       1949       2019       2090       2162       2236       2308       2383       2458       2555       2612       2691       2771       52         53       1811       1880       1950       2020       2091       2163       2296       2309       2384       2459       2555       2614       2692       2772       53         54 <td></td>   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 49         1807         1876         1945         2015         2083         2158         2231         2304         2379         2454         2531         2608         2687         2767         49           50         1809         1877         1946         2017         2038         2159         2232         2306         2380         2456         2532         2610         2688         2768         50           51         1809         1878         1948         2018         2089         2161         2233         2307         2381         2457         2539         2611         2690         2770         51           52         1810         1879         1949         2019         2090         2162         2235         2308         2383         2458         2535         2612         2691         2771         52           53         1811         1880         1950         2020         2091         2163         2236         2309         2384         2459         2536         2614         2692         2772         53           54         1813         1881         1951         2021         2092         2164         2237         2311   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 50 1808 1877 1946 2017 2038 2159 2292 2306 2380 2456 2532 2610 2688 2768 50 51 1809 1878 1948 2018 2089 2161 2233 2307 2381 2457 2533 2611 2690 2770 51 52 1810 1879 1949 2019 2090 2162 2235 2308 2383 2458 2535 2612 2691 2771 52 53 1811 1880 1950 2020 2091 2163 2236 2309 2384 2459 2536 2614 2692 2772 53 54 1813 1881 1951 2021 2092 2164 2237 2311 2385 2461 2537 2615 2694 2774 54 55 1814 1888 1952 2022 2094 2165 2236 2312 2386 2462 2538 2616 2695 2775 55 1814 1888 1952 2022 2094 2165 2236 2312 2386 2462 2538 2616 2695 2775 55 56 1815 1884 1953 2024 2095 2167 2239 2313 2388 2463 2540 2617 2696 2776 56 57 1816 1885 1955 2025 2096 2168 2241 2314 2389 2464 2541 2619 2698 2776 56 1817 1886 1956 2026 2097 2169 2242 2316 2390 2466 2542 2620 2699 2779 58 59 1818 1887 1957 2027 2098 2170 2243 2317 2391 2467 2544 2621 2700 2780 59  |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 50     1808     1877     1948     2018     2089     2161     2233     2307     2381     2457     2533     2611     2690     2770     51       52     1810     1879     1949     2019     2090     2162     2235     2308     2383     2458     2535     2612     2691     2771     52       53     1811     1880     1950     2020     2091     2163     2296     2309     2384     2459     2536     2614     2692     2772     53       54     1813     1881     1951     2021     2092     2164     2237     2311     2385     2461     2537     2615     2694     2772     54       55     1814     1883     1952     2022     2094     2165     2236     2312     2386     2462     2538     2616     2695     2775     55       56     1815     1884     1953     2024     2095     2167     2239     2313     2388     2462     2538     2616     2695     2776     56       57     1816     1885     1956     2025     2096     2168     2241     2314     2389     2464     2541     2617     269   | 49 | 1807          | 1876 | 1945 | 2015 | 2086  | 2158 | 2231 | 2304 | 2379   | 2454 | 2531 | 2608 | 2687 | 2/0/ | 23    |
| 51         1809         1878         1948         2018         2089         2161         2233         2907         2981         2457         2533         2611         2690         2770         51           52         1810         1879         1949         2019         2090         2162         2235         2308         2383         2458         2535         2612         2691         2771         52           53         1811         1880         1950         2020         2091         2163         2296         2309         2384         2459         2536         2614         2692         2772         53           54         1813         1881         1951         2021         2092         2164         2237         2311         2385         2461         2537         2615         2694         2772         53           55         1814         1883         1952         2022         2094         2165         2238         2312         2386         2461         2537         2615         2694         2775         56           56         1815         1884         1953         2024         2095         2167         2239         2313   | 50 | 1909          | 1877 | 1946 | 2017 | 2038  | 2150 | 2232 | 2306 | 2380   | 2456 | 2539 | 2610 | 2688 | 2768 | 50    |
| 52     1810     1879     1949     2019     2090     2162     2235     2308     2383     2488     2535     2612     2691     2771     52       53     1811     1880     1950     2020     2091     2163     2296     2309     2384     2459     2536     2614     2692     2772     53       54     1813     1881     1951     2021     2092     2094     2165     2237     2311     2385     2461     2537     2615     2694     2774     54       55     1814     1884     1953     2024     2095     2167     2239     2312     2386     2462     2588     2616     2695     2775     55       57     1816     1885     1955     2025     2096     2168     2241     2314     2389     2464     2541     2617     2698     2776     56       58     1817     1886     1956     2026     2097     2169     2242     2316     2390     2466     2542     2620     2699     2779     58       59     1818     1887     1957     2027     2098     2170     2243     2317     2391     2467     2544     262   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      | 51    |
| 53     1811     1880     1950     2020     2091     2163     2286     2309     2384     2459     2536     2614     2692     2772     53       54     1813     1881     1951     2021     2092     2164     2237     2911     2385     2461     2537     2615     2694     2774     54       55     1814     1888     1952     2022     2094     2165     2238     2312     2386     2462     2538     2616     2695     2775     55       56     1815     1884     1953     2024     2095     2167     2239     2313     2388     2463     2540     2617     2696     2776     56       57     1816     1885     1955     2025     2096     2168     2241     2314     2389     2464     2541     2619     2693     2776     56       58     1817     1886     1956     2026     2097     2169     2242     2316     2390     2466     2542     2620     2699     2779     58       59     1818     1887     1957     2027     2098     2170     2243     2317     2391     2467     2544     2621     270   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 54     1813     1881     1951     2021     2092     2164     2237     2311     2385     2461     2537     2615     2694     2774     54       55     1814     1888     1952     2022     2094     2165     2236     2312     2386     2462     2538     2616     2695     2775     55       56     1815     1884     1953     2024     2095     2167     2239     2313     2388     2463     2540     2617     2696     2776     56       57     1816     1885     1955     2026     2097     2169     2241     2314     2389     2464     2541     2619     2698     2776     56       58     1817     1886     1956     2026     2097     2169     2242     2316     2390     2466     2542     2620     2699     2779     58       59     1818     1887     1957     2027     2098     2170     2243     2317     2391     2467     2544     2621     2700     2780     59  |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      | 53    |
| 55     1814     1888     1952     2022     2094     2165     2236     2312     2386     2462     2538     2616     2695     2775     55       56     1815     1884     1953     2024     2095     2167     2239     2313     2388     2463     2540     2617     2696     2776     56       57     1816     1885     1955     2025     2096     2168     2241     2314     2389     2464     2541     2619     2698     2778     57       58     1817     1886     1956     2026     2097     2169     2242     2316     2390     2466     2542     2620     2699     2779     58       59     1818     1887     1957     2027     2098     2170     2243     2317     2391     2467     2544     2621     2700     2780     59  |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      | 54    |
| 56     1815     1884     1953     2024     2095     2167     2239     2313     2388     2463     2540     2617     2696     2776     56       57     1816     1885     1955     2025     2096     2168     2241     2314     2389     2464     2541     2619     2698     2778     57       58     1817     1886     1956     2026     2097     2169     2242     2316     2390     2466     2542     2620     2699     2779     58       59     1818     1887     1957     2027     2098     2170     2243     2317     2391     2467     2544     2621     2700     2780     59  |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 57 1816 1885 1955 2025 2096 2168 2241 2314 2389 2464 2541 2619 2698 2778 57 1817 1886 1956 2026 2097 2169 2242 2316 2390 2466 2542 2620 2699 2779 58 59 1818 1887 1957 2027 2098 2170 2243 2317 2391 2467 2544 2621 2700 2780 59   |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 58     1817     1886     1956     2026     2097     2169     2242     2316     2390     2466     2542     2620     2699     2779     58       59     1818     1887     1957     2027     2098     2170     2243     2317     2391     2467     2544     2621     2700     2780     59  |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
| 59 1818 1887 1957 2027 2098 2170 2243 2817 2391 2467 2544 2621 2700 2780 59  |    |               |      |      |      |       |      |      |      |        |      |      |      |      |      |       |
|  |    |               |      |      |      |       |      | 2243 |      | 2391   | 2467 | 2544 | 2621 | 2700 | 2780 | 59    |
| M.   28°   29°   30°   31°   32°   33°   34°   35°   36°   37°   38°   39°   40°   41°   14°   |    |               |      | !    | 212  |       | 000  | 0.0  | 0.50 |        | 070  | 000  | 000  | 400  | 410  | M.    |
|  | М. | 280           | 290  | 305  | 310  | 320   | 83   | 34   | 35   | 360    | 37   | 265  | . 29 | 10   | 71   |       |

### MERIDIONAL PARTS

| M.       | 42°          | 430          | 440          | 45°          | 46°          | 47°          | 480          | 49°          | 50°          | <i>5</i> 1°           | 52°          | 53°          | 54°           | 55°          | M.       |
|----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------------|--------------|--------------|---------------|--------------|----------|
| 0        | 2782         | 2863         | 2946         | 3030         | 3116         | 3203         | 3292         | 3382         | 3474         | 3569                  | 3665         | 3764         | 3865          | 3968         | 0        |
| - 1      | 2783         | 2864         | 2947         | 3031         | 3117         | 3204         | 3293         | 3384         | 3476         | <b>3</b> 570          | 3667         | 3765         | 3866          | 3970         | 1        |
| 2        | 2784         |              | 2949         | 3033         |              | 3206         | 3295         | 3385         | 3478         | 3572                  | 3668         | 3767         | 3868          | 3971         | 2        |
| 3        | 2786         | 2867         | 2950         | 3034         |              | 3237         | 3296         | 3387         | 3479         | 3574                  |              | 3769         | 3870          | 8973         | 3<br>4   |
| 5        | 2787<br>2788 | 2869<br>2870 | 2951<br>2953 | 3036<br>3037 | 3121<br>3123 | 3209<br>3210 | 3298<br>3299 | 3388<br>3390 | 3481<br>3482 | 3575<br>3577          | 3672<br>3673 | 3770<br>3772 | 3871<br>3873  | 3975<br>3977 | 5        |
| 6        | 2790         | 2871         | 2954         | 3038         | 3124         | 9212         | 3301         | 3391         | 3484         | 3578                  | 3675         | 3774         | 3875          | 3978         | 6        |
| 7        | 2791         | 2873         | 2956         | 3040         | 3126         | 3213         | 3302         | 3393         | 3485         | 3580                  | 3677         | 3775         | 3877          | 3980         | 7        |
| 8        | 2792         | 2874         | 2957         | 3041         | 3127         | 3214         | 3303         | 3394         | 3487         | 3582                  | 3678         | 3777         | 3878          | 5982         | 8        |
| 9        | 2794         | 2875         | 2958         | 3043         | 3129         | 3216         | 3305         | 3396         | 3488         | 3583                  | 3680         | 3779         | <b>38</b> 80  | 3984         | 9        |
| 10       | 2795         | 2877         | 2960         | 3044         | 3130         | 3217         | 3306         | 3397         | 3490         | 3585                  | 3681         | 3780         | 3882          | 3985         | 10       |
| 11       | 2797         | 2878         | 2961         | 3046         | 3130         | 3219         | 3308         | 3399         | 3492         | 3586                  | 3683         | 3782         | 3883          | 3987         | 11       |
| 12       | 2798         | 2880         | 2963         | 3047         | 3133         | 3220         | 3309         | 3400         | 3493         | 3588                  | 3685         | 3784         | 3885          | 3989         | 12       |
| 13       | 2799         | 2881         | 2964         | 3048         |              | 3222         | 3311         | 3402         | 3495         | 3590                  | 3686         | 3785         |               | 3991         | 13       |
| 14       | 2801         | 2882         | 2965         | 3050         | 3136         | 3223         | 3312         | <b>3</b> 403 | 3496         | 3591                  | 3688         | 3787         | 3889          | 3992         | 14       |
| 15       | 2802         | 2884         | 2967         | 3051         | 3137         | 3225         | 3314         | 3405         | 3498         | 3593                  | 3690         | 3789         | 3890          | 3994         | 15       |
| 16       | 2803         | 2885         | 2968         | 3053         | 3139         | 3226         | 3316         | 3407         | 3499         | 3594                  |              | 3790         | 3892          |              | 16       |
| 17       | 2805         | 2886         | 2970         | 3054         | 3140         | 3228         | 3317         | 3408         | 3501         | 3596                  | 3693         | 3792         | 3894          | 3998         | 17       |
| 18       | 2806         | 2888         | 2971         | 3055         | 3142         | 3229         | 8319         | 3410         | 3508         | 3598                  | 3695         | 3794         | 3895          | 3999         | 18       |
| 19       | 2807         | 2889         | 2972         | 3057         | 3143         | <b>32</b> 31 | 3320         | 3411         | 3504         | 3599                  | 3696         | 3795         | 3897          | 4001         | 19       |
| 20       | 2809         | 2891         | 2974         | 3058         | 3144         | 3232         | 3322         | 3413         | 3506         | 3601                  | 3698         | 3797         | 3899          | 4003         | 20       |
| 21       | 2810         | 2892         | 2975         | 3060         | 3146         | 3234         | 3323         | 3414         | 3507         | 3602                  | 3699         | 3799         | 3901          | 4005         | 21 '     |
| 22       | 2811         | 2893         | 2976         | 3061         | 9147         | 3235         | 3325         | 3416         | 3509         | 3604                  | 3701         | 3800         | 3902          | 4006         | 22       |
| 23       | 2813         | 2895         | 2978         | 3063         | 3149         | 3237         | 3326         | 3417         | 3510         | 3606                  | 3703         | 3802         | 3904          | 4008         | 23       |
| 24       | 2814         | 2896         | 2979         | 3064         | 3150         | 3238         | 3328         | 3419         | 3512         | 3607                  | 3704         | 3804         | 3906          | 4010         | 24       |
| 25       | 2815         | 2897         | <b>29</b> 81 | 3065         | 3152         | 3240         | 3329         | 3420         | 3514         | 3609                  | 3706         | 3806         | 3907          | 4012         | 25       |
| 26       | 2817         | 2899         | 2982         | 3067         | 3153         | 3241         | 3331         | 3422         | 9515         | 3610                  | 3708         | 3807         | 3909          | 4014         | 26       |
| 27<br>28 | 2818         | 2900         | 2983         | 3068         | 3155         | 3242         |              | 3423         | 3517         | 3612                  | 3709         | 3809         | 3911          | 4015         | 27<br>28 |
| 29       | 2820<br>2821 | 2902         | 2985         | 3070         | 3156         | 3244<br>3245 | 3384         | 3425<br>3427 | 3518<br>3520 | 3614                  | 3711         | 3811         | 3913          | 4017<br>4019 | 29       |
| 29       | 2021         | 2903         | 2986         | 3071         | 3157         | 3243         | 3335         | 3427         | 3520         | 3615                  | 3713         | 3812         | 3914          | 1019         |          |
| 30       | 2822         | 2904         | 2988         | <b>3</b> 073 | 3159         | 3247         | 3337         | 3428         | 3521         | 3617                  | 3714         | 3814         | 3916          | 4021         | 30       |
| 31       | 2824         | 2906         | 2989         | 3074         | 3160         | 3248         | 3338         | 3430         | 3523         | 3618                  | 3716         | 3816         | 3918          | 4022         | 31       |
| 32       | 2825         | 2907         | 2991         | 3075         | 3162         | 8250         | 3340         | 3431         | 3525         | 3620                  | 3717         | 3817         | 3919          | 4024         | 32       |
| 33       | 2826         | 2908         | 2992         | 3077         | 3163         | 3251         | 3341         | 3438         | 3526         | 3622                  | 3719         | 3819         | 3921          | 4026         | 33       |
| 34       | 2828         | 2910         | 2993         | . 3078       | 3165         | <b>525</b> 3 | 3343         | 3434         | 3528         | 3623                  | 3721         | 3821         | 3923          | 4028<br>4029 | 34<br>35 |
| 36       | 2829<br>2830 | 2911<br>2913 | 2995<br>2996 | 3080<br>3081 | 3166<br>3168 | 3254<br>3256 | 9344<br>3346 | 3436<br>3437 | 3529<br>3531 | 3625<br>3626          | 3722<br>3724 | 3822<br>3824 | 3925<br>3926  | 4031         | 36       |
| 37       | 2832         | 2914         | 2998         | 3083         | 3169         | 3257         | 3347<br>3347 | 3439         | 3532         | 3628                  | S726         | 3826         | 3928          | 4033         | 37       |
| 38       | 2833         | 2915         | 2999         | 3084         | 3171         | 3259         | 3349         | 3440         | 3534         | 3630                  | 3727         | 3827         | 8930          | 4035         | 38       |
| 39       | 2834         | 2917         | 3000         | 3085         | 3172         | 3260         | 3350         | 3442         | 3536         | 3631                  | 3729         | 3829         | 3932          | 4037         | 39       |
| 40       | 0400         |              |              |              |              |              |              |              |              |                       |              |              |               |              | 40       |
| 40       | 2436         | 2918         | 3002         | 3087         | 3173         | 3262         | 3332         | 3448         | 3537         | 3699                  | 3731         | 3831         | 3933          | 4038         | 40       |
| 41<br>42 | 2837         | 2919         | 3003         | 3088         | 3175         | 3263         | 3359         |              | 3539         | 3634                  | 3732         | 3832         | 3955          | 4040         | 41<br>42 |
| 43       | 2839<br>2840 | 2921<br>2922 | 3005<br>3006 | 3090<br>3091 | 3176<br>3178 | 3265<br>3266 | 3355<br>3356 | 3447<br>3448 | 3540<br>3542 | 3636<br>36 <b>3</b> 8 | 3734<br>3736 | 3854<br>3856 | 3937<br>.3938 | 4042<br>4044 | 43       |
| 44       | 2841         | 2922<br>2924 | 3006         | 3091         | 3179         | 3268         | 3358         | 3450         |              | 3639                  | 3736         | 3838         | 3940          | 4045         | 44       |
| 45       | 2843         | 2925         | 3009         | 3094         | 3181         | <b>3</b> 269 | 3359         | 3451         | 3545         | 3641                  | 3737         | 3839         | 3942          | 4047         | 45       |
| 46       | 2844         | 2926         | 3010         | 3095         | 3182         | 3271         | 3361         | 3453         | 3547         | 3643                  | 3741         | 3841         | 3944          | 4049         | 46       |
| 47       | 2845         | 2928         | 3012         | 3097         | 3184         | 3272         | 3362         | 3454         | 3548         | 3644                  | 3742         | 3843         | 3945          | 4051         | 47       |
| 48       | 2847         | 2929         | 3013         | 3098         | 3185         | 3274         | 3364         | 3456         | 3550         | 3646                  | 3744         | 3844         | 3947          | 4052         | 48       |
| 49       | 2848         | 2931         | 3014         | 3100         | 3187         | 3275         | 3365         | 3457         | 8551         | 3647                  | 3746         | 3846         | 3949          | 4054         | 49       |
| 50       | 2849         | 2932         | 3016         | 3101         | 3188         | 3277         | 8367         | 3459         | 3553         | 3649                  | 3747         | 3848         | 3951          | 4056         | 50       |
| 51       | 2851         | 2932         | 3017         | 3101         | 3190         | 3278         | 3368         | 3460         | 3555         | 3651                  | 3749         | 3849         | 3952          | 4058         | 51       |
| 52       | 2852         | 2935         | 3019         | 3103         | 3191         | 3210         | 3370         | 5462         | 3556         | 3652                  | 3750         | 3851         | 3954          | 4060         | 52       |
| 53       | 2854         | 2936         | 3020         | 3105         | 3192         | 3281         | 3371         | 3464         | 3558         | 3654                  | 3752         | 3853         | 3956          | 4061         | 53       |
| 54       | 2855         | 2937         | 3021         | 3107         | 3194         | 3283         | 3373         | 3465         | 3559         | 3655                  | 3754         | 3854         | 3958          | 4063         | 54       |
| 55       | 2856         | 2939         | 3023         | 3108         | 3195         | 3284         |              | 3467         | 3561         | 3657                  | 3755         | 3856         | 3959          | 4065         | 55       |
| 56       | 2858         | 2940         | 3024         | 3110         | 3197         | 3286         | 8376         | 3468         | 3562         | 3659                  | 3757         | 3858         | 3961          | 4067         | 56       |
| 57       | 2859         | 2942         | 3026         | 3111         | 3198         | 3287         | 3378         | 3470         |              | <b>S</b> 660          | 3759         | 3860         | 3968          |              | 57       |
| 58       | 2860         | 2943         | 9027         | 3118         | 3200         | 3289         | 3379         | 3471         | 3566         | 3662                  | 3760         | 3861         | 3964          |              | 58       |
| 59       | 2862         | 2944         | 3029         | 3114         | 3201         | 3290         | 3331         | 3473         | 3567         | 3664                  | 3762         | 3863         | 3966          | 4072         | 59       |
| M.       | 420          | 430          | 44°          | 45°          | 460          | 470          | 48°          | 49°          | 500          | 51°                   | 520          | 53°          | 540           | 55°          | M.       |
| _        |              |              | <u>-</u> -   |              | <u>-</u>     |              | <u> </u>     |              |              |                       |              |              |               |              | ·        |

#### MERIDIONAL PARTS.

| M                    | 56°          | 57°          | 58°          | 59°          | 60°          | 61°          | 62°          | 63°          | 64°              | 65°            | 66°          | 67°          | 68°                   | 69°          | M.       |
|----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------------|----------------|--------------|--------------|-----------------------|--------------|----------|
| 0                    | 4074         | 4183         | 4294         | 4409         | 4527         | 4649         | 4775         | 4905         | 5039             | 5179           | 5324         | 5474         | 5631                  | 5795         | 0        |
| 1                    | 4076         | 4184         | 4296         | 4411         | 4529         | 4651         | 4777         | 4907         | 5042             | 5181           | 5326         | 5477         | 5633                  | 5797         | ì        |
| 2                    | 4077         | 4186         | 4293         |              | 4531         | 4653         | 4779         | 4909         | 504 <del>4</del> | 5184           |              | 5479         | 5636                  | 5800         | 2        |
| 3                    | 4079         | 4188         | 4300         | 4415         | 4533         | 4655         | 4781         | 4912         | 5046             | 5186           | 5331         | 5482         | 5639                  | 5803         | 3        |
| 4<br>5               | 4081         | 4190         | 4302         | 4417         | 4535         | 4657         | 4784         | 4914         | 5049             | 5188           | 5333         | 5484         | 5642                  | 5806         | 4        |
| 6                    | 4083<br>4085 | 4192<br>4194 | 4304<br>4306 | 4419<br>4421 | 4537<br>4539 | 4660<br>4662 | 4786<br>4788 | 4916<br>4918 | 5051<br>5053     | 5191<br>5193   | 5336<br>5338 | 5487<br>5489 | 5644<br>5647          | 5809<br>5811 | 5<br>6   |
| 7                    | 4086         | 4195         | 4308         | 4423         | 4541         | 4664         |              | 4920         | 5055             | 5195           | 5341         | 5492         | 5650                  | 5814         | 7        |
| 8                    | 4088         | 4197         | 4309         | 4425         | 4543         | 4666         | 4792         | 4923         | 50.58            | 5198           | 5343         | 5495         | 5652                  | 5817         | 8        |
| 9                    | 4090         | 4199         | 4311         | 4427         | 4545         | 4668         | 4794         | 4925         | <b>506</b> 0     | 5200           | 5346         | 5497         | 5655                  | 5820         | 9        |
| 10                   | 4092         | 4201         | 4313         | 4429         | 4547         | 4670         | 4796         | 4927         | 5062             | 5203           | 5348         | 5500         | 5658                  | 5823         | 10       |
| 11                   | 4094         | 4203         | 4315         | 4431         | 4549         | 4672         | 4798         | 4929         | 5065             | 5205           | 5351         | 5502         | 5660                  | 5825         | 11       |
| 12                   | 4095         | 4205         | 4317         | 4433         | 4551         | 4674         | 4801         | 4931         | 5067             | 5207           | 5353         | 5505         | 5663                  | 5828         | 12       |
| 13                   | 4097         | 4207         | 4319         | 4434         | 4558         | 4676         |              | 4934         | 5069             | 5210           |              | 5507         | 5666                  | 5831         | 13       |
| 14                   | 4099         |              | 4321         | 4436         | 4555         | 4678         |              | 4936         | 5071             | 5212           | <i>5</i> 358 | 5510         | 5668                  | 5834         | 14       |
| 15                   | 4101         | 4210         | 4323         | 4438         | 4557         | 4680         |              | 4938         | 5074             | 5214           | 5361         | 5513         | 5671                  | 5837         | 15       |
| 16<br>17             | 4103         | 4212         | 4325         | 4440         | 4559         | 4682         | 4809         | 4940         | 5076             | 5217           | 5363         | 5515         | 5674                  | 5839         | 16       |
| 18                   | 4104<br>4106 | 4214<br>4216 | 4327<br>4328 | 4442<br>4444 | 4562<br>4564 | 4684<br>4687 | 4811<br>4814 | 4943<br>4945 | 5078<br>5081     | 5219<br>5222   | 5366         | 5518<br>5520 | 5676                  | 5842         | 17<br>18 |
| 19                   | 4108         | 4218         | 4330         | 4446         | 4566         | 4689         | 4816         | 4947         | 5083             | 5222<br>5224   | 5968<br>5371 | 5523         | 5679<br>5682          | 5845<br>5848 | 19       |
|                      |              |              |              |              |              | '            |              |              |                  |                |              |              |                       |              |          |
| 20                   | 4110         | 4220         | 4332         | 4448         | 4568         | 4691         | 4818         | 4949         | 5085             | 5226           | 5373         | 5526         | 5685                  | <i>5</i> 851 | 20       |
| 21<br>22             | 4112<br>4113 | 4221<br>4223 | 4334<br>4336 | 4450<br>4452 | 4570<br>4572 | 4693<br>4695 | 4820<br>4822 | 4951         | 5088             | 5229           | 5376         | 5528         | 5687                  | 5854         | 21<br>22 |
| 23                   | 4115         | 4225         | 4336         | 4454         | 4574         | 4697         |              | 4954<br>4956 | 5090<br>5092     | 5231<br>5234   | 5378<br>5380 | 5531<br>5533 | 5690<br>5693          | 5856<br>5859 | 23       |
| 24                   | 4117         | 4227         | 4340         | 4456         | 4576         | 4699         | 4826         | 4958         | 5095             | 5236           |              | 5536         | 5695                  | 5862         | ı        |
| 25                   | 4119         | 4229         | 4342         | 4458         | 4578         | 4701         |              | 4960         | 5097             | 5238           |              | 5539         | 5698                  | 5865         | 25       |
| 26                   | 4121         | 4231         | 4344         | 4460         | 4580         | 4703         |              | 4963         | 5099             | 5241           |              | 5541         | 5701                  | 5868         | 26       |
| 27                   | 4122         | 4232         | 4346         | 4462         |              | 4705         | 4833         | 4965         | 5102             |                | 5390         | 5544         | 5704                  | 5871         | 27       |
| 28                   | 4124         | 4234         | 4347         | 4464         | 4584         | 4707         | 4835         | 4967         | 5104             | 5246           |              | 5546         | 5706                  | 5874         | 28       |
| 29                   | 4125         | 4236         | 4349         | 4466         | 4586         | 4710         | 4837         | 4969         | 5106             | 5248           | 5395         | 5549         | 5709                  | <i>5</i> 876 | 29       |
| 80                   | 4128         | 4238         | 4951         | 4468         | 4588         | 4712         | 4839         | 4972         | 5108             | 5250           | 5398         | 5552         | 5712                  | 5879         | 30       |
| 31                   | 4130         | 4240         | 4353         | 4470         | 4590         | 4714         | 4842         | 4974         | 5111             | 5253           |              | 5554         | 5715                  | 5882         | 31       |
| ,32                  | 4132         | 4242         | 4955         | 4472         | 4592         | 4716         | 4844         | 4976         | 5113             | 5255           | 5403         | 5557         | 5717                  | 5885         | 32       |
| 33                   | 4133         | 4244         | 4357         | 4474         | 4594         | 4718         | 4846         | 4978         | 5115             | 5258           |              | 5559         | 5720                  | 5888         | 33       |
| 34<br>35             | 4135<br>4137 | 4246<br>4247 | 4359<br>4361 | 4476<br>4478 | 4596<br>4598 | 4720<br>4722 | 4848<br>4850 | 4981<br>4983 | 5118             | 5260           |              | 5562         | 5723                  | 5891         | 34<br>35 |
| 36                   | 4139         | 4249         | 4969         | 4480         | 4600         | 4724         | 4852         | 4985         | 5120<br>5122     | 5263<br>5265   | 5411<br>5413 | 5565<br>5567 | 5725<br>5728          | 5894<br>5896 | 36       |
| 37                   | 4141         | 4251         | 4365         | 4482         | 4602         | 4726         | 4855         | 4987         | 5125             | 5267           | 5416         | 5570         | 5731                  | 5899         | 37       |
| 38                   | 4142         | 4253         | 4367         | 4484         | 4604         | 4728         | 4857         | 4990         | 5127             | 5270           | 5418         | 5573         | 5784                  | 5902         | 38       |
| 39                   | 4144         | 4255         | 4369         | 4486         | 4606         | 4731         | 4859         | 4992         | 5129             | 5272           | 5421         | 5575         | 5736                  | 5905         | 39       |
| 40                   | 4146         | 4257         | 4370         | 4488         | 4608         | 4738         | 4861         | 4994         | 5132             | 5275           | 5423         | 5578         | 5739                  | 5908         | 40       |
| 41                   | 4148         | 4259         | 4372         | 4490         | 4610         | 4735         | 4863         | 4996         | 5134             | 5277           | 5426         | 5580         | 5742                  | 5911         | 41       |
| 42                   | 4150         | 4260         | 4374         | 4492         | 4612         | 4737         | 4865         | 4999         | 5136             | 5280           | 5428         | 5588         | 5745                  | 5914         | 42       |
| 43                   | 4152         | 4262         | 4376         | 4494         | 4614         | 4739         | 4868         | 5001         | 513 <b>9</b>     | 5282           | 5431         | 5586         | 5747                  | 5917         | 43       |
| 44                   | 4153         | 4264         | 4378         | 4495         | 4616         |              | 4870         | 5003         | 5141             | 5284           | 5433         | 5588         | <i>5</i> 7 <i>5</i> 0 | 5919         | 44       |
| 45                   | 4155         | 4266         | 4380         | 4497         | 4618         | 4743         | 4872         | 5005         | 5143             | 5287           | 5436         | 5591         | 5753                  | 5922         | 45       |
| <del>4</del> 6<br>47 | 4157<br>4159 | 4268<br>4270 | 4382         | 4499         | 4620         | 4745         | 4874         | 5008         | 5146             | 5289           | 5438         | 5594         | 5756                  | 5925         | 46<br>47 |
| 48                   | 4161         | 4272         | 4384<br>4386 | 4501<br>4508 | 4623<br>4625 | 4747<br>4750 | 4876<br>4879 | 5010<br>5012 | 5148<br>5151     | 5292<br>5294   | 5441<br>5443 | 5596<br>5599 | 5758<br>5761          | 5928<br>5931 | 48       |
| 49                   | 4162         | 4274         | 4388         | 4505         | 4627         | 4752         | 4881         | 5014         | 5153             | 5297           | 5446         | 5602         | 5764                  | 5934         | 49       |
|                      |              |              | <u> </u>     |              |              |              |              |              |                  |                |              |              |                       |              |          |
| <i>5</i> 0           | 4164         | 4275         | 4390         | 4507         | 4629         | 4754         | 4883         | 5017         | 5155             | 5299           | 5448         | 5604         | 5767                  | 5937         | 50       |
| 51<br>52             | 4166<br>4168 | 4277<br>4279 | 4992<br>4994 | 4509<br>4511 | 4631<br>4633 | 4756<br>4758 | 4885<br>4887 | 5019<br>5021 | 5158             | 5301           | 5451         | 5607         | 5770                  | 5940         | 51<br>52 |
| 53                   | 4170         | 4281         | 4394         | 4513         | 4635         | 4760         | 4890         | 5021         | 5160<br>5162     | 5304<br>5306   | 5454<br>5456 | 5610<br>5612 | 5772<br>5775          | 5943<br>5946 | 53       |
| 54                   | 4172         | 4283         | 4398         | 4515         | 4637         | 4762         | 4892         | 5025         | 5165             | 5309           | 5459         | 5615         | 5778                  | 5948         | 54       |
| 55                   | 4173         | 4285         | 4399         | 4517         | 4639         | 4764         | 4894         | 5028         | 5167             | / <b>5</b> 311 | 5461         | 5617         | 5781                  | 5951         | 55       |
| 56                   | 4175         | 4287         | 4401         | 4519         | 4641         | 4766         | 4896         | 5030         | 5169             | 5314           | 5464         | 5620         | 5783                  | 5954         | 56       |
| - 57                 | 4177         | 4289         | 4403         | 4521         | 4643         | 4769         | 4898         | 5033         | 5172             | 5316           | 5466         | 5623         | 5786                  | 5957         | 57       |
| <i>5</i> 8           | 4179         | 4291         | 4405         | 4523         | 4645         | 4771         | 4901         | 5035         | 5174             | <b>5</b> 319   | 5469         | 5625         | 5789                  | 5960         | 58       |
| 59                   | 4181         | 4292         | 4407         | 4525         | 4647         | 4773         | 4903         | 5037         | 5176             | 5321           | 5471         | 5628         | 5792                  | 5963         | 59       |
| M.                   | 56°          | 57°          | 580          | 590          | 60°          | 61°          | 62°          | 63°          | 64°              | 65°            | 660          | 67°          | 68°                   | 69°          | M,       |
|                      |              |              |              |              |              |              |              |              |                  |                |              |              |                       |              |          |

### MERIDIONAL PARTS.

| M.                               | 700          | 71°          | 720          | 73°          | 74°           | 75°          | 76°          | 770                   | 780          | 79°          | 80°          | 81°  | 82°    | 83°                   | M.         |
|----------------------------------|--------------|--------------|--------------|--------------|---------------|--------------|--------------|-----------------------|--------------|--------------|--------------|------|--------|-----------------------|------------|
| 0                                | 5966         | 6146         | 6335         | 6534         | 6746          | 6970         | 7210         | 7467                  | 7745         | 8046         | 8375         | 8739 | 9145   | 9606                  | 0          |
| 1                                | 5969         | 6149         | 6338         | <b>65</b> 38 | 6749          | 6974         | 7214         | 7472                  | 7749         | 8051         | 8381         | 8745 | 9158   | 9614                  | 1          |
| -2                               | 5972         | 6152         | 6341         | 6541         | <b>675</b> 3  | 6978         | 7218         | 7476                  | 7754         | 8056         | 8387         | 8752 |        | 9622                  | 2          |
| 3                                | 5975         | 6155         | 6345         | 6545         | 6757          | 6982         | 7222         | 7481                  | 7759         | 8061         | 8393         | 8758 | 9167   | 9631                  | 3          |
| 4                                | 5978         | 6158         | 6348         | 6548         | 6760          | 6986         | 7227         | 7485                  | 7764         | 8067         | 8398         | 8765 | 9174   | 9639                  | 4          |
| 5                                | 5981         | 6161         | 6351         | 6552         | 6764          | 6990         | 7231         | 7490                  | 7₹69         | 8072         | 8404         | 8771 | 9182   | 9647                  | 5          |
| 6                                | 5984         | 6164         | 6354         | 6555         | 6768          | 6994         | 7235         | 7494                  | 7774         | 8077         | 8410         | 8778 | 9189   | 9655                  | 6          |
| 7                                | 5986         | 6167         | 6358         | 6558         | 6771          | 6997         | 7239         | 7498                  | 7778         | 8083         | 8416         | 8784 | 9196   | 9664                  | 7          |
| 8                                | 5989         | 6170         | 6361         | 6562         | 6775          | 7001         | 7243         | 7503                  | 7783         | 8088         | 8422         | 8791 | 9203   | 9672                  | 8          |
| 9                                | 5992         | 6173         | 6364         | 6565         | 6779          | 7005         | 7247         | 7507                  | 7788         | 8093         | 8427         | 8797 | 9211   | 9630                  | 9          |
| 10                               | 5995         | 6177         | 6367         | 6569         | 6782          | 7009         | 7252         | 7512                  | 7793         | 8099         | 8433         | 8804 | 9218   | 9689                  | 10         |
| 11                               | 5998         | 6180         | 6371         | 6572         | 6786          | 7013         | 7256         | 7516                  | 7798         | 8104         | 8439         | 8810 | 9225   | 9697                  | 11         |
| 12                               | 6001         | 6183         | 6374         | 6576         | 6790          | 7017         | 7260         | 7521                  | 7803         | 8109         | 8445         | 8817 | 9233   | 9706                  | 1,2        |
| 13                               | 6004         | 6186         | 6377         | 6579         | 6793          | 7021         | 7264         | 7.525                 | 7808         | 8115         | 8451         | 8823 | 9240   | 9714                  | 13         |
| 14                               | 6007         | 6189         | 6380         | 6583         | 6797          | 7025         | 7268         | 7530                  | 7813         | 8120         | 8457         | 8830 | 9248   | 9723                  | 14         |
| 15                               | 6010         | 6192         | 6384         | 6586         | 6801          | 7029         | 7273         | 7535                  | 7817         | 8125         | 8463         | 8836 | 9255   | 9731                  | 15         |
| 16                               | 6013         | 6195         | 6387         | 6590         | 6804          | 7033         | 7277         | 7539                  | 7822         | 8131         | 8469         | 8843 | 9262   | 9740                  | 16         |
| 17                               | 6016         | 6198         | 6390         | 6593         | 6808          | 7037         | 7281         | 7544                  | 7827         | 8136         | 8474         | 8849 | 9270   | 9748                  | 17         |
| 18                               | 6019         | 6201         | 6394         | 6597         | 6812          | 7041         | 7285         | 7548                  | 7832         | 8141         | 8480         | 8856 | 9277   | 9757                  | 18         |
| 19                               | 6022         | 6205         | 6397         | 6600         | 6815          | 7045         | 7289         | <b>755</b> 3          | 7837         | 8147         | 8483         | 8863 | 9285   | 9765                  | 19         |
| 20                               | 6025         | 6208         | 6400         | 6603         | 6819          | 7048         | 7294         | 7557                  | 7842         | 8152         | 8492         | 8869 | 9292   | 9774                  | 20         |
| 21                               | 6028         | 6211         | 6403         | 6607         | 68 <b>2</b> 3 | 7052         | 7298         | 7562                  | 7847         | 8158         | 8498         | 8876 |        | 9783                  | 21         |
| 22                               | 6031         | 6214         | 6407         | 6610         | 6826          | 7056         | 7302         | 7566                  | 7852         | 8163         | 8504         | 8883 | 9307   | 9791                  | 22         |
| 23                               | 6034         | 6217         | 6410         | 6614         | 6830          | 7060         | 7306         | 7571                  | 7857         | 8168         | 8510         | 8889 | 9315   | 9800                  | 23         |
| 24                               | 6037         | 6220         | 6413         | 6617         | 6834          | 7064         | 7311         | 7576                  | 7862         | 8174         | 8516         | 8896 | .9322  | 9809                  | 24         |
| 25                               | 6040         | 6223         | 6417         | 6621         | 6838          | 7068         | 7315         | 7580                  | 7867         | 8179         | 8522         |      | 9530   | 9817                  | 25         |
| 26                               | 6043         | 6226         | 6420         | 6624         | 6841          | 7072         | 7319         | 7585                  | 7872         | 8185         | 8528         | 8909 |        | 9826                  | 26         |
| 27                               | 6046         | 6230         | 6423         | 6628         | 6845          | 7076         | 7323         | 7589                  | 7877         | 8190         | 8534         |      | 9345   | 9835                  | 27         |
| 28<br>29                         | 6049         | 6233         | 6427         | 6631         | 6849          | 7080         |              | 7594                  | 7882         | 8196         | 8540         |      | 9358   | 9844                  | 28         |
| 49                               | 6052         | 6236         | 6430         | 6635         | 6853          | 7084         | 7832         | 7599                  | 7887         | 8201         | 8546         | 8930 | 9360   | 9852                  | 29         |
| 30                               | 6055         | 6239         | 6433         | 6639         | 6856          | 7088         | 7336         | 7603                  | 7892         | 8207         | 8552         | 8936 | 9368   | 9861                  | 30         |
| 31                               | 6058         | 6242         | 6437         | 6642         | 6860          | 7092         | 17341        | 7608                  | 7897         | 8212         | 8558         | 8943 |        | 9870                  | 31         |
| 32                               | 6061         | 6245         | 6440         | 6646         | 6864          | 7096         | 7345         | 7612                  | 7902         | 8218         | 8565         | 8950 | 9383   | 9879                  | 32         |
| 33                               | 6064         | 6249         | 6443         | 6649         | 6868          | 7100         | 7349         | 7617                  | 7907         | 8223         | 8571         | 8957 | 9391   | <b>98</b> 83          | 33         |
| 34                               | 6067         | 6252         | 6447         | 6653         | 6871          | 7104         | 7353         | 7622                  | 7912         | 8229         | 8577         | 8963 |        | 9897                  | 34         |
| 35                               | 6070         | 6255         | 6450         | 6656         | 6875          | 7108         | 7358         | 7626                  | 7917         | 8234         | 8583         | 8970 |        | 9906                  | 35         |
| 36<br>37                         | 6073         | 6258         | 6453         | 6660         | 6879<br>6889  | 7112         | 7362         | 7631                  | 7922         | 8240         | 8589         | 8977 | 9414   | 9915                  | 36         |
| 38                               | 6076         | 6261         | 6457         | 6663         | 6886          | 7116         | 7366         | 7636                  | 7927         | 8245         | 8595         |      |        | 9924                  | 37<br>38   |
| 39                               | 6079<br>6082 | 6264<br>6268 | 6460<br>6463 | 6667<br>6670 | 6890          | 7120         | 7871<br>7875 | 7640                  | 7932         | 8251         | 8601         | 8991 |        | 9933<br>9 <b>94</b> 2 | 39         |
|                                  |              | 0200         | 0403         | 0070         |               | 7124         | 1313         | 7645                  | 7937         | 8256         | 8607         | 0880 | 9438   | 9942                  |            |
| 40                               | 6085         | 6271         | 6467         | 6674         | 6894          | 7128         | 7379         | 7650                  | 7942         | 8262         | 8614         | 9005 | 9445   | 9951                  | 40         |
| 41                               | 6038         | 6274         | 6470         | 6677         | 6898          | 7132         | 7384         | 7654                  | 7948         | 8267         | 8620         | 9012 | 9453   | 9960                  | .41        |
| 42                               | 6091         | 6277         | 6473         | 6681         | 6901          | 7136         | 7388         | 7659                  | 7953         | 8273         | 8626         |      | 9461   | 9969                  | 42         |
| 43<br>44                         | 6094         | 6280         | 6477         | 6685         | 6905          | 7140         | 7392         | 7664                  | 7958         | 8279         | 8632         |      | 9469   | 9978                  | 43         |
| 45                               | 6097         | 6283         | 6480         | 6688         | 6909<br>6913  | 7145         | 7397         | 7668                  | 7963         | 8284         | 8638,        |      | 9477   | 9987                  | 44         |
| 46                               | 6100         | 6287         | 6483         | 6692         | 6913          | 7149         | 7401         | 7673                  | 7968         | 8290         | 8644         |      | 9485   |                       | 45<br>46   |
| 47                               | 6106         | 6290<br>6293 | 6487<br>6490 | 6695<br>6699 | 6920          | 7153         | 7406<br>7410 | 7678<br>7683          | 7973         | 8295         | 8651         |      |        | 10005                 | 47         |
| 48                               | 6109         | 6296         | 6494         | 6702         | 6924          | 7157<br>7161 | 7410         | 7687                  | 7978<br>7983 | 8301         | 8657         |      |        | 10015<br>10024        | 48         |
| 49                               | 6112         | 6299         | 6497         | 6706         | 6928          | 7165         | 7419         | 7692                  | 7989         | 8307<br>8312 | 8663<br>8669 |      |        | 10033                 | 49         |
|                                  | -            | -            |              |              |               |              |              |                       |              |              |              |      |        |                       |            |
| 50                               | 6115         | 6303         | 6500         | 6710         | 6932          | 7169         |              | 7697                  | 7994         | 8518         | 8676         |      |        | 10043                 | 50         |
| 51<br>50                         | 6118         | 6306         | 6504         | 6713         |               | 7173         |              | 7702                  | 7999         | 8324         |              |      |        | 10052                 | 51         |
| 52<br>58                         | 6121         |              | 6507         |              |               |              | 7432         |                       | 8004         |              | 8688         | 9088 | 9541   | 10061                 | 52         |
| 53<br>54<br>55<br>56<br>57<br>58 | 6124         |              | 6511         |              | 6943          |              | 7436         | 7711                  | 8009         |              |              | 9096 | 9549   | 10071                 | 58         |
| 55                               | 6127<br>6130 |              | 6514         |              | 6947<br>6951  |              | 7441         | 7716                  |              |              |              |      |        | 10080                 |            |
| 56                               | 6139         | 6319<br>6322 | 6517<br>6521 | 6728<br>6731 | 6951<br>6955  | 7189<br>7194 |              | 7721                  | 8020         |              |              |      |        | 10089                 | ł .        |
| 57                               | 6136         | 6322         | 6521         | 6735         | 6959          | 7194         |              | 77 <b>2</b> 5<br>7730 | 8025<br>8030 |              | 8714<br>8720 |      |        | 10099<br>10108        |            |
| 58                               | 6140         | 6328         | 6528         | 6738         | 6963          | 7202         | 7454         | 7735                  | 8035         | ,            | 8726         | 9131 |        | 10118                 | •          |
| 59                               | 6143         | 6332         | 6531         | 6742         | 6966          | 7206         | 7463         |                       | 8040         |              | 8733         |      |        | 10127                 | ľ          |
| M.                               | 700          | 710          |              |              |               |              |              |                       |              |              |              |      |        |                       |            |
| 1                                | 100          | 710          | 720          | 730          | 740           | 75°          | 7601         | 770                   | 78°          | 79°          | 800 (        | 810  | 1, 823 | 830                   | <u>M</u> . |

## TABLE XV. DOMINICAL LETTER.

| M.   84°   85°   86°   87°   88°   89°  |    | 7                                       | <b>VEKID</b> | IONAL | PAR   | TS.   |       |    |
|---|----|---|--------------|-------|-------|-------|-------|----|
| 1   10147   10776   11547   12541   13945   16357   2   10166   10799   11576   12580   14004   16476   4   10175   10811   11590   12599   14033   16537   5   10185   10823   11605   12619   14063   16599   7   10205   10846   11634   12659   14123   16726   8   10214   10858   11649   12679   14154   16792   9   10224   10870   11664   12699   14123   16726   11   10244   10893   11694   12739   14247   16996   11   10244   10893   11694   12739   14247   16996   11   10244   10993   11709   12759   14279   17067   13   10264   10917   11724   12780   14311   17140   14   10274   10929   11739   12801   14543   17213   15   10284   10941   11755   12821   14376   17289   16   10294   10953   11770   12842   14409   17366   17   10304   10965   11785   12863   14442   17444   18   10314   10978   11801   12885   14475   17526   17   10304   10990   11816   12906   14509   17609   10344   11097   11801   12885   14475   17526   17504   11094   11097   11863   12907   14613   17870   12034   11094   11848   12949   14578   17781   12034   11094   11879   12992   14648   17962   10354   11037   11863   12971   14613   17870   12034   11054   11911   13037   14780   1855   10364   11014   11848   12949   14578   17781   12046   11059   11879   12992   14648   17694   10546   11059   11879   12992   14648   18056   10395   11077   11927   13059   14756   18252   10364   11102   11959   13104   14880   18461   12949   14684   18056   10395   11077   11927   13059   14756   18252   10466   11102   11959   13104   14880   14861   10478   11179   12058   13266   15002   19309   15143   14949   13050   14131   1127   11902   13149   14904   18683   10416   11102   11959   13104   14880   18661   14047   11140   12008   13172   14944   18799   10530   11281   12109   13314   15184   19596   10447   11140   12008   13172   14944   18799   10530   11281   12109   13314   15184   19596   19494   10586   13109   12465   13397   15062   19174   10569   11247   12199   13461   15442   20635   14460   13367   13290   13543     | M. | 840                                     | 85°          | 86°   | 87°   | 886   | 890   |    |
| 1   10147   10776   11547   12541   13945   16357   2   10166   10799   11576   12580   14004   16476   4   10175   10811   11590   12599   14033   16537   5   10185   10823   11605   12619   14063   16599   7   10205   10846   11634   12659   14123   16726   8   10214   10858   11649   12679   14154   16792   9   10224   10870   11664   12699   14123   16726   11   10244   10893   11694   12739   14247   16996   11   10244   10893   11694   12739   14247   16996   11   10244   10993   11709   12759   14279   17067   13   10264   10917   11724   12780   14311   17140   14   10274   10929   11739   12801   14543   17213   15   10284   10941   11755   12821   14376   17289   16   10294   10953   11770   12842   14409   17366   17   10304   10965   11785   12863   14442   17444   18   10314   10978   11801   12885   14475   17526   17   10304   10990   11816   12906   14509   17609   10344   11097   11801   12885   14475   17526   17504   11094   11097   11863   12907   14613   17870   12034   11094   11848   12949   14578   17781   12034   11094   11879   12992   14648   17962   10354   11037   11863   12971   14613   17870   12034   11054   11911   13037   14780   1855   10364   11014   11848   12949   14578   17781   12046   11059   11879   12992   14648   17694   10546   11059   11879   12992   14648   18056   10395   11077   11927   13059   14756   18252   10364   11102   11959   13104   14880   18461   12949   14684   18056   10395   11077   11927   13059   14756   18252   10466   11102   11959   13104   14880   14861   10478   11179   12058   13266   15002   19309   15143   14949   13050   14131   1127   11902   13149   14904   18683   10416   11102   11959   13104   14880   18661   14047   11140   12008   13172   14944   18799   10530   11281   12109   13314   15184   19596   10447   11140   12008   13172   14944   18799   10530   11281   12109   13314   15184   19596   19494   10586   13109   12465   13397   15062   19174   10569   11247   12199   13461   15442   20635   14460   13367   13290   13543     | 0  | 10157                                   | 10765        | 11533 | 12522 | 13917 | 16300 |    |
| 3         10166         10799         11576         12580         14004         16476           4         10175         10811         11590         12599         14063         16599           5         10195         10843         11620         12639         14093         16589           7         10205         10846         11634         12659         14123         16726           8         10214         10881         11674         12699         14185         16858           10         10234         10881         11679         12719         14216         16926           11         10244         10893         11694         12739         14277         16996           12         10254         10905         11709         12759         14279         17067           13         10264         10917         11724         12780         14311         17167           14         10274         10929         11739         12801         14343         17218           16         10294         10953         11770         12842         14409         17366           17         10344         10953         11770  |    | 10147                                   |              | 11547 |       |       |       |    |
| 4         10175         10811         11590         12599         14033         16597           5         10185         10823         11605         12619         14063         16597           6         10195         10834         11620         12659         14123         16726           8         10214         10858         11649         12679         14154         16792           9         10224         10870         11664         12699         14185         16858           10         10234         10881         11679         12719         14216         16926           11         10244         10893         11799         12759         14279         17067           13         10264         10917         11724         12780         14311         17140           14         10274         10929         11755         12831         14311         17140           14         10274         10923         11779         12842         14421         17444           16         10294         10945         11755         12863         14442         17444           16         10294         10953         11707  |    |   |              |       |       | -     |       |    |
| 5         10185         10823         11605         12619         14063         16599           6         10195         10834         11620         12639         14093         16662           7         10205         10846         11634         12659         14154         16726           8         10214         10858         11649         12679         14154         16792           9         10224         10870         11664         12699         14185         16858           10         10234         10881         11679         12719         14247         16996           11         10244         10893         11694         12739         14247         16996           12         10264         10917         11724         12780         14311         17140           14         10274         10929         11739         12801         14343         17213           15         10284         10941         11755         12821         14376         17366           16         10234         10951         11755         12863         14442         17444           16         10234         10951         11811  |    |   |              |       |       |       |       |    |
| 6         10195         10834         11620         12639         14093         16662           7         10205         10846         11634         12639         14124         16726           8         10214         10858         11649         12679         14154         16792           9         10924         10870         11664         12699         14185         16858           10         10234         10881         11679         12719         14216         16926           11         10244         10893         11694         12739         14277         16996           12         10254         10905         11709         12759         14279         17067           13         10264         10921         11735         12821         14343         17213           14         10274         10929         11735         12821         14376         17289           16         10294         10953         11770         12842         14409         17366           17         10304         10978         1801         12852         14475         1756           18         10314         10978         1801  |    |   |              |       |       |       |       |    |
| 7         10205         10846         11634         12659         14123         16726           8         10214         10858         11649         12679         14154         16792           9         10224         10870         11664         12699         14185         16858           10         10234         10881         11679         12719         14216         16926           11         10244         10893         11739         12719         14279         17067           13         10264         10917         11739         12801         14311         17140           14         10274         10929         11735         12821         14376         17289           16         10294         10953         11770         12842         14409         17366           17         10304         10965         11785         12863         14442         17444           18         10341         10978         11801         12885         14475         17569           20         10334         10022         11832         12927         14543         17694           21         10341         11032         12927  |    |   |              |       |       |       |       |    |
| 8   10214   10858   11649   12679   14154   16792   9   10924   10870   11664   12699   14185   16858   10244   10893   11694   12739   14247   16996   12   10244   10893   11694   12739   14247   16996   12   10244   10905   11709   12759   14279   17067   13   10264   10917   11724   12780   14311   17140   14   10274   10929   11739   12801   14343   17213   15   10284   10941   11755   12821   14876   17289   16   10294   10953   11770   12842   14409   17366   17   10304   10965   11785   12863   14442   17444   18   10314   10978   11801   12885   14475   17526   19   10324   10990   11816   12906   14509   17609   10344   11014   11848   12949   14578   17781   10354   11014   11848   12949   14578   17781   122   10354   11027   11863   12971   14613   17870   12344   10374   11052   11885   13014   14684   18056   10395   11064   11911   13037   14720   18153   1261   14684   18056   10395   11077   11927   13059   14756   18252   10405   11089   11943   13081   14793   18455   10447   11140   12008   13172   14944   18799   10456   11115   11976   13126   14868   18570   10437   11127   11992   13149   14906   18683   10468   11166   12041   13219   15022   19045   10478   11179   12058   13242   15062   19174   10559   11291   12059   15143   19499   10500   11205   12092   13290   15143   19449   10539   11281   12109   13144   15184   19596   10500   11205   12092   13290   15143   19449   10568   11270   12177   13411   15354   20252   10364   11281   12109   13314   15184   19596   10500   11205   12092   13461   15482   20439   10575   11297   12212   13461   15482   20439   10563   11270   12177   13411   15354   20252   10674   11281   12194   13436   15398   20439   10563   11494   12194   13436   15398   20439   10563   11494   12194   13436   15398   20439   10563   11494   12194   13436   15398   20439   10563   11496   12254   13664   15442   20635   14960   1388   12265   13597   15573   21065   10665   11496   12248   1376   16025   24842   10666   11448   12409   13749   15602   24255 |    |   |              |       |       |       |       | 1  |
| 10  | 8  | 10214                                   | 10858        | 11649 | 12679 |       |       | ı  |
| 11         10244         10893         11694         12799         14247         16996           12         10254         10905         11709         12759         14279         17067           13         10264         10917         11724         12780         14311         17140           14         10274         10929         11739         12801         14543         17213           15         10284         10941         11755         12821         14476         17289           16         10294         10953         11770         12842         14409         17366           17         10304         10965         11785         12885         14475         17526           19         10324         10990         11816         12906         14509         17609           20         10334         11002         11832         12927         14543         17694           21         10354         11031         11848         12949         14578         17781           21         10354         11031         11833         12971         14613         17802           21         10374         11052         11893   | 9  | 10224                                   | 10870        | 11664 | 12699 | 14185 | 16858 | -  |
| 12         10254         10905         11709         12759         14279         17067           13         10264         10917         11724         12780         14311         17140           14         10274         10929         11739         12801         14313         17213           15         10284         10941         11755         12821         14376         17289           16         10294         10953         11770         12842         14409         17366           17         10304         10965         11785         12863         14442         17446           18         10314         10978         11801         12885         14475         17526           19         10334         11002         11832         12927         14543         17694           21         10344         11071         11863         12971         14613         17769           21         10344         11039         11879         12929         14648         18056           21         10344         11052         11895         13014         14684         18056           25         10385         11077         11927   |    |   |              |       |       |       | _     |    |
| 13         10264         10917         11724         12780         14311         17140           14         10274         10929         11739         12801         14548         17213           15         10284         10941         11755         12821         14376         17289           16         10294         10953         11770         12842         14409         17366           17         10304         10965         11785         12863         14442         17444           18         10314         10990         11816         12906         14509         17609           20         10334         11002         11832         12927         14543         17694           21         10344         11014         11848         12949         14578         17760           21         10354         11027         11863         12971         14613         17870           23         10364         11037         11879         12929         14648         17962           24         10374         11052         11895         13041         14684         18056           25         10385         110647         11911 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>╟</td>   |    |   |              |       |       |       |       | ╟  |
| 14         10274         10929         11739         12801         14343         17213           15         10284         10941         11755         12821         14876         17289           16         10294         10953         11770         12842         14409         17366           17         10304         10965         11785         12863         14442         17444           18         10314         10978         11801         12885         14475         17526           19         10324         10990         11816         12906         14509         17609           20         1034         11002         11832         12927         14543         17694           21         10344         11014         11848         12949         14578         17780           21         10354         11021         11863         12971         14618         17780           21         10344         11052         11885         13014         14684         18056           24         10374         11052         11895         13014         14684         18056           25         10355         11077         11927  |    |   |              |       |       |       |       | I  |
| 15         10284         10941         11755         12821         14876         17289           16         10294         10953         11770         12842         14409         17366           17         10304         10965         11785         12863         14442         17444           18         10314         10978         11801         12885         14475         17526           19         10324         10990         11816         12906         14509         17609           20         10334         11002         11832         12927         14543         17694           21         10344         11031         11848         12949         14578         17781           22         10354         11039         11879         12992         14648         17962           24         10374         11052         11895         13014         14684         18056           25         10385         11064         11911         13037         14720         18153           26         10385         11077         11927         13059         14758         18252           27         10405         11089         11943   |    |   |              |       |       |       |       | I  |
| 17         10304         10965         11785         12863         14442         17444           18         10314         10978         11801         12885         14475         17526           19         10324         10990         11816         12906         14509         17609           20         10334         11002         11832         12927         14543         17694           21         10344         11014         11848         12949         14578         17781           21         10354         11027         11863         12971         14613         17870           23         10364         11039         11879         12992         14648         17962           24         10374         11052         11895         1304         14684         18056           25         10385         11064         11911         13037         14790         18153           26         10395         11077         11927         13059         14756         18252           27         10405         11089         11943         13081         14793         18355           28         10461         11102         119079   | 15 | 10284                                   | 10941        | 11755 |       |       |       | 1  |
| 18         10314         10978         11801         12885         14475         17526           19         10324         10990         11816         12906         14509         17609           20         10334         11002         11832         12927         14543         17694           21         10334         11014         11848         12949         14578         17781           22         10354         11027         11863         12971         14613         17780           23         10364         11039         11879         12992         14648         17962           24         10374         11052         11895         13014         14684         18056           25         10385         11064         11911         13037         14790         18153           26         10395         11077         11927         13059         14756         18252           27         10405         11089         11941         14906         18683         18570           30         10437         11127         11992         13149         14964         18799           31         10447         11140         12008   |    |   |              |       |       |       |       | 1  |
| 10324   10990   11816   12906   14509   17609   |    |   |              |       |       |       |       |    |
| 20         10334         11002         11832         12927         14543         17694           21         10344         11014         11848         12949         14578         17781           22         10354         11027         11863         12971         14613         17870           23         10364         11039         11879         12992         14648         18956           24         10374         11052         11895         13014         14684         18056           25         10385         11077         11927         13059         14756         18252           27         10405         11089         11943         13081         14793         1855           28         10416         1102         11959         13104         148:0         1863           31         10426         11115         11976         13126         14868         18570           30         10437         11127         11992         13149         14906         18683           31         10447         11140         12008         13172         14944         18799           32         10457         11153         12025  |    |   |              |       |       |       |       | I  |
| 21         10344         11014         11848         12949         14578         17781           22         10354         11037         11863         12971         14613         17870           23         10364         11039         11879         12992         14648         18056           24         10374         11052         11895         13014         14684         18056           25         10385         11064         11911         13037         14720         18153           26         10395         11077         11927         13059         14756         18252           27         10405         11089         11943         13081         14793         18355           28         10416         11102         11959         13104         148:00         18461           29         10426         11115         11976         13126         14868         18570           30         10437         11127         11992         13149         14906         18683           31         10447         11140         12008         13172         14944         18799           32         10457         11153         12025 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>  |    |   |              |       |       |       |       |    |
| 22         10354         11027         11863         12971         14613         17870           23         10364         11039         11879         12992         14648         17962           24         10374         11052         11895         13014         14684         18956           25         10385         11064         11911         13037         14720         18153           26         10395         11077         11927         13059         14756         18252           27         10405         11089         11943         13081         14793         18855           28         10416         11102         11959         13104         148:0         18461           29         10426         11115         11976         13149         14906         18683           31         10447         11140         12008         13172         14944         18799           32         10457         11153         12025         13195         14983         18920           33         10468         1166         12041         13219         15022         19045           34         10478         1179         12051   |    |   |              |       |       |       |       | H  |
| 23         10364         11039         11879         12992         14648         17962           24         10374         11052         11895         13014         14684         18056           25         10385         11064         11911         13037         14720         18153           26         10395         11077         11927         13059         14756         18252           27         10405         11089         11943         13081         14793         18355           28         10416         11102         11959         13104         148:0         18461           29         10426         11117         11992         13149         14906         18683           31         10447         11140         12008         13172         14944         18799           31         10468         11166         12041         13219         15022         19045           34         10478         11179         12058         13242         15062         19174           35         10489         11192         12075         13266         15002         19309           36         10500         11205         12075   | 22 |   |              |       |       |       |       | 1  |
| 25         10385         11064         11911         13037         14720         18153           26         10395         11077         11927         13059         14756         18252           27         10405         11089         11943         13081         14793         18355           28         10416         11102         11959         13104         148:00         18461           29         10426         11115         11976         13126         14868         18570           30         10437         11127         11992         13149         14906         18683           31         10447         11140         12008         13172         14944         18799           32         10457         11153         12025         13195         14983         18920           33         10468         1166         12041         13219         15022         19045           34         10478         11179         12055         13266         15102         19309           36         10501         11218         12109         13314         15184         19496           37         10510         11218         12193   |    |   |              |       |       |       |       |    |
| 26         10395         11077         11927         13059         14756         18252           27         10405         11089         11943         19081         14793         18355           28         10416         11102         11959         13104         14830         18461           29         10426         11115         11976         13126         14868         18570           30         10437         11117         11992         13149         14906         18683           31         10447         11140         12008         13172         14944         18799           32         10457         11153         12025         13195         14983         18920           33         10468         11165         12041         13219         15022         19045           34         10478         11179         12058         13242         15062         19174           35         10489         11192         12075         13266         15102         19309           36         10500         11218         12109         13314         15184         19596           38         10521         11231         12126   |    |   |              |       |       |       |       | 1  |
| 27         10405         11089         11943         13081         14793         18355           28         10416         11102         11959         13104         148:0         18461           29         10426         11115         11976         13126         14868         18570           30         10437         11127         11992         13149         14906         18683           31         10447         11140         12008         13172         14944         18799           32         10457         11153         12025         13195         14983         18920           33         10468         11166         12041         13219         15022         19045           34         10478         11179         12058         13242         15062         19174           35         10489         11120         12075         13266         15102         19309           60         10500         11201         12075         13266         15102         19309           71         10510         11218         12109         13314         15184         19596           38         10521         11218         12196   |    |   |              |       |       |       |       | 1  |
| 28         10416         11102         11959         13104         14830         18461           29         10426         11115         11976         13126         14868         18570           30         10437         11127         11992         13149         14906         18683           31         10447         11140         12008         13172         14944         18799           32         10457         11153         12025         13195         14983         18920           33         10468         11166         12041         13219         15022         19045           34         10478         11179         12058         13242         15062         19174           35         10489         11192         12075         13266         15102         19309           36         10500         11201         12002         13290         15143         19449           37         10510         11218         12109         13314         15184         19596           38         10521         11231         12126         13383         15266         19749           39         10532         11244         12143   | _  |   |              |       |       |       |       |    |
| 29         10426         11115         11976         13126         14868         18570           30         10437         11127         11992         13149         14906         18683           31         10447         11140         12008         13172         14944         18799           32         10457         11153         12025         13195         14983         18920           33         10468         11166         12041         13219         15022         19045           34         10478         11179         12075         13266         15102         19309           36         10500         11208         12092         13290         15143         19449           37         10510         11218         12109         13314         15184         19596           38         10521         11231         12129         13344         15184         19596           39         10532         11244         12143         13362         15268         19908           40         10543         11257         12160         13387         15310         20076           41         10558         11270         12177   |    |   |              |       |       |       |       |    |
| 31         10447         11140         12008         13172         14944         18799           32         10457         11153         12025         13195         14983         18920           33         10468         11166         12041         13219         15022         19045           34         10478         11179         12058         13242         15062         19174           35         10489         11192         12075         13266         15102         19309           96         10500         11205         12092         13290         15143         19449           97         10510         11218         12109         13314         15184         19596           38         10521         11231         12126         13383         15226         19749           39         10532         11244         12143         13362         15268         19908           40         10543         11257         12160         13387         15310         20076           41         10558         11270         12177         13411         15354         20252           42         10364         11284         12194   |    |   |              |       |       |       |       |    |
| 32         10457         11153         12025         13195         14983         18920           33         10468         11166         12041         13219         15022         19045           34         10478         1179         12058         13242         15062         19174           35         10489         11192         12075         13266         15102         19309           36         10500         11205         12092         13290         15143         19449           97         10510         11218         12109         19314         15184         19596           38         10521         11231         12126         13388         15226         19749           39         10532         11244         12143         13362         15268         19908           40         10543         11257         12160         13387         15310         20076           41         10553         11270         12177         13411         15354         20252           42         10364         11284         12149         13436         15487         20439           43         10575         11297         12212  |    |   |              | 11992 | 13149 | 14906 | 18683 |    |
| 33         10468         11166         12041         13219         15022         19045           34         10478         11179         12058         13242         15062         19174           35         10489         11192         12075         13266         15102         19309           36         10500         11205         12092         13290         15143         19449           97         10510         11218         12109         13314         15184         19596           38         10521         11231         12196         13838         15226         19749           39         10532         11244         12143         13362         15568         19908           40         10543         11257         12160         13387         15510         20076           41         10553         11270         12177         13411         15354         20252           42         10364         11284         12194         13436         15348         20439           43         10575         11297         12217         13461         15442         20635           44         10586         11310         12229   |    |   |              |       |       |       |       |    |
| 34         10478         11179         12058         13242         15662         19174           35         10489         11192         12075         13266         15102         19309           36         10500         11205         12092         13290         15143         19449           97         10510         11218         12109         13314         15184         19596           38         10521         11231         12126         13388         15226         19749           39         10532         11244         12143         13362         15268         19908           40         10543         11257         12160         13387         15310         20076           41         10553         11270         12177         13411         15354         20652           42         10364         11284         12194         13436         15398         20439           43         10575         11297         12212         13461         15442         20635           44         10586         11310         12229         13486         15487         20843           45         10597         11324         12247   |    |   |              |       |       |       |       |    |
| 35         10489         11192         12075         13266         15102         19309           36         10500         11205         120902         13290         15143         19449           37         10510         11218         12109         13314         15184         19596           38         10521         11231         12126         13383         15226         19749           39         10532         11244         12143         13362         15268         19908           40         10543         11257         12160         13387         15310         20076           41         10553         11270         12177         19411         15354         20252           42         10364         11284         12194         13461         15487         20635           43         10575         11297         12212         13461         15487         20635           44         10586         11310         12229         13486         15487         20635           45         10597         11324         12247         13512         15533         21065           46         10688         11338         12265 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>  |    |   |              |       |       |       |       |    |
| 36         10500         11205         12092         13290         15143         19449           37         10510         11218         12109         13314         15184         19596           38         10521         11231         12126         13388         15226         19749           39         10532         11244         12143         13362         15268         19908           40         10543         11257         12160         13387         15310         20076           41         10558         11270         12177         13411         15354         20252           42         10364         11284         12194         13436         15398         20439           43         10575         11297         12212         13461         15442         20635           44         10586         11310         12229         13486         15487         20843           45         10577         11324         12247         13512         15533         21065           46         10608         11398         12265         13597         15579         21302           47         10619         11351         12282   |    |   |              |       |       |       |       |    |
| 87         10510         11218         12109         19314         15184         19596           38         10521         11231         12126         13398         15226         19749           39         10532         11244         12143         13362         15268         19908           40         10543         11257         12160         13387         15310         20076           41         10553         11270         12177         13411         15354         20252           42         10364         11284         12194         13436         15482         20635           44         10586         11310         12229         13461         15442         20635           45         10597         11324         12247         13512         15533         21065           46         10688         11398         12267         13577         15579         21302           47         10619         11351         12282         13563         15673         21832           49         10641         11378         12318         13615         15721         22132           50         10652         11392         12336   |    |   |              |       |       |       |       | I  |
| 39         10532         11244         12143         13362         15268         19908           40         10543         11257         12160         13387         15310         20076           41         10558         11270         12177         13411         15354         20252           42         10364         11284         12194         13461         15482         20439           43         10575         11297         12212         13461         15442         20635           44         10586         1310         12229         13486         15487         20843           45         10397         11324         12247         13512         15533         21065           46         10608         11338         12265         13557         15579         21302           47         10619         11351         12282         13569         15675         21832           49         10641         11378         12318         13615         15721         22132           50         10652         11392         12366         13641         15770         22459           51         10663         1406         12354   | 87 |   |              | 12109 |       |       |       | 1  |
| 40         10543         11257         12160         13387         15310         20076           41         10553         11270         12177         13411         15354         20252           42         10364         11284         12194         13436         15398         20439           43         10575         11297         12212         13461         15442         20635           44         10586         11310         12229         13461         15442         20635           45         10397         11324         12247         13512         15533         21065           46         10608         11338         12265         13537         15579         21302           47         10619         11351         12282         13563         15673         21832           49         10641         11378         12318         13615         15721         22132           50         10652         11392         12336         13641         15770         22459           51         10663         1406         12354         13668         15819         23296           52         10674         14420         12373  |    |   |              |       |       |       |       | _  |
| 41   10558   11270   12177   13411   15354   20252   42   10364   11284   12194   13436   15398   20439   43   10575   11297   12212   13461   15442   20635   44   10586   11310   12229   13486   15487   20843   45   10397   11324   12247   13512   15533   21065   46   10608   11338   12265   13537   15579   21302   47   10619   11351   12282   13569   15673   21832   49   10641   11378   12318   13615   15721   22132   10641   11378   12318   13615   15721   22132   10641   11378   12318   13615   15721   22132   10641   1406   12354   13668   15819   22821   10685   11494   12373   13694   15869   23266   10685   14494   12391   13721   15920   23685   10685   14494   12409   13749   15972   24215   10710   11462   12428   13776   16025   24842   10719   11476   12446   13804   16078   25609   57   10730   11490   12465   13832   16132   25598   10742   11504   12484   13860   16187   27992   59   10753   11518   12508   13888   16243   30375  | 39 | 10532                                   | 11244        | 12143 | 13362 | 15268 | 19908 | 1  |
| 42         10364         11284         12194         13436         15398         20439           43         10575         11297         12212         13461         15442         20635           44         10586         11310         12229         13486         15487         20843           45         10597         11324         12247         13512         15533         21065           46         10608         11338         12265         13597         15579         21302           47         10619         11351         12282         13569         15673         21832           49         10641         11378         12318         13615         15721         22132           50         10652         11392         12336         13615         15771         22459           51         10663         11406         12354         13668         15819         23245           52         10674         11420         12373         13694         15869         23226           53         10685         11434         12391         13721         15920         23685           54         10896         11448         12409   |    |   |              |       |       |       |       | ١. |
| 48   10575   11297   12212   13461   15442   20635   44   10586   11310   12229   13486   15487   20843   45   10597   11924   12247   13512   15533   21065   46   10608   11338   12265   13537   15579   21302   47   10619   11351   12282   13563   15625   21557   48   10630   1365   12300   13589   15673   21832   49   10641   11378   12318   13615   15721   22132   50   10652   11392   12336   13641   15770   22459   51   10663   11406   12354   13668   15819   22821   52   10674   11420   12373   13694   15869   23226   53   10685   11448   12391   13721   15920   23685   54   10696   11448   12409   13749   15972   24215   56   10719   11476   12428   13776   16025   24842   57   10730   11490   12465   13802   16132   26598   58   10742   11504   12484   13860   16187   27992   59   10753   11518   12508   13888   16243   30375  |    |   |              |       |       |       |       | '  |
| 44         10586         11310         19229         13486         15487         20843           45         10397;         11324         19247         13512         15533         21065           46         10608         11388         12265         13537         15579         21302           47         10619         11351         12282         13563         15625         21557           48         10630         1365         12300         13589         15673         21832           49         10641         11378         12318         13615         15721         22132           50         10652         11392         12336         13641         15770         22459           51         10663         11406         12354         13664         15819         22821           52         10674         11420         12373         13694         15869         23226           53         10685         11449         12391         13721         15920         23685           54         10696         11448         12409         13749         15972         24215           55         10719         11476         12446   |    |   |              |       |       |       |       | -  |
| 45         10397         11324         19247         13512         15533         21065           46         10608         11338         12265         13557         15579         21302           47         10619         11351         12282         13569         15625         21557           48         10630         15665         12300         13589         15673         21832           49         10641         11378         12318         13615         15721         22132           50         10652         11392         12336         13641         15770         22459           51         10663         11406         12354         13668         15819         22821           52         10671         11420         12373         13694         15869         23265           53         10685         1434         12301         13721         15920         23685           54         10696         11448         12409         13749         15972         24215           55         10708         11462         12428         13776         16025         24842           56         10719         11476         12446  |    |   |              |       |       |       |       | _  |
| 47         10619         11351         12282         13563         15625         21557         48         10630         14365         12300         13589         15673         21832         49         10641         11378         12318         13615         15721         22132         50         10652         11392         12336         13641         15770         22459         51         10663         11406         12354         13668         15819         22821         52         10674         11420         12373         13694         15869         23226         53         10685         14434         12391         13721         15920         23685         54         10696         11448         12409         13749         15972         24215         55         10708         11462         12428         13776         16025         24842         56         10719         11476         12446         13804         16078         25609         57         10730         11490         12465         13832         16132         26598         58         10742         11504         12484         13860         16187         27992         59         10753         11518         12508         13888         16243  |    |   | 11324        | 12247 | 13512 |       |       | ı  |
| 48     10630     1365     12300     13589     15673     21832       49     10641     11378     12318     13615     15721     22132       50     10652     11392     12336     13641     15770     22459       51     10663     11406     12354     13668     15819     22821       52     10674     11420     12373     13694     15869     23226       53     10685     11449     12391     13721     15920     23685       54     10696     11448     12409     13749     15972     24215       55     10708     11462     12428     13776     16025     24842       56     10719     11476     12446     13804     16078     25609       57     10730     11490     12465     13892     16132     26598       58     10742     11504     12484     13860     16187     27992       59     10753     11518     12508     13888     16243     30375  |    |   |              |       |       |       |       | 1  |
| 49         10641         11378         12318         13613         15721         22132           50         10652         11392         12336         13641         15770         22459           51         10663         11406         12354         13668         15819         2821           52         10674         11420         12373         13694         15869         23226           53         10685         11434         12391         13721         15920         23685           54         10696         11448         12409         13749         15072         24215           55         10708         11462         12428         13776         16025         24842           56         10719         11476         12446         13804         16078         25609           57         10730         11490         12465         13832         16132         26598           58         10742         11504         12484         13860         16187         27992           59         10753         11518         12508         13888         16243         30375   |    |   |              |       |       |       |       | -  |
| 50         10652         11392         12336         13641         15770         22459           51         10663         11406         12354         13668         15819         22821           52         10674         11420         12373         13694         15869         23226           53         10685         11434         12391         13721         15920         23685           54         10696         11448         12409         13749         15972         24215           55         10708         11462         12428         13776         16025         24842           56         10719         11476         12446         13804         16078         25609           57         10730         11490         12465         13832         16132         26598           58         10742         11504         12484         13860         16187         27992           59         10753         11518         12508         13888         16243         30375   |    |   |              |       |       |       |       | -  |
| 51     10663     11406     12354     13668     15819     22821       52     10674     11420     12373     13694     15869     23226       53     10685     11434     12391     13721     15920     23685       54     10696     11448     12409     13749     15972     24215       55     10708     11462     12428     13776     16025     24842       56     10719     11476     12446     13804     16078     25609       57     10730     11490     12465     13832     16132     26598       58     10742     11504     12484     13860     16187     27992       59     10753     11518     12508     13888     16243     30375  |    | <u> </u>                                |              |       |       |       |       | L  |
| 52     10674     11420     12373     13694     15869     23226       53     10685     11434     12391     13721     15920     23685       54     10696     11448     12409     13749     15972     24215       55     10708     11462     12428     13776     16025     24842       56     10719     11476     12446     13804     16078     25609       57     10730     11490     12465     13832     16132     26598       58     10742     11504     12484     13860     16187     27992       59     10753     11518     12508     13888     16243     30375   | 51 | 10663                                   | 11406        |       | 10000 |       | 20221 |    |
| 54     10696     11448     12409     13749     15572     24215       55     10708     11462     12428     13776     16025     24842       56     10719     11476     12446     13804     16078     25609       57     10730     11490     12465     13832     16132     26598       58     10742     11504     12484     13860     16187     27992       59     10753     11518     12508     13888     16243     30375   |    |   | 11420        | 12373 | 13694 | 15869 | 23226 | 1  |
| 55     10708     11462     12428     13776     16025     24842       56     10719     11476     12446     13804     16078     25609       57     10730     11490     12465     13832     16132     26598       58     10742     11504     12484     13860     16187     27992       59     10753     11518     12508     13888     16243     30375  |    |   |              |       |       |       |       | -  |
| 56     10719     11476     12446     13804     16078     25609       57     10730     11490     12465     13832     16132     26598       58     10742     11504     12484     13860     16187     27992       59     10753     11518     12508     13888     16243     30375   |    |   |              |       |       |       |       | 1  |
| 57 10730 11490 12465 13832 16132 26598 58 10742 11504 12484 13860 16187 27992 59 10753 11518 12508 13888 16243 30375  |    |   |              |       |       |       |       |    |
| 58     10742     11504     12484     13860     16187     27992       59     10753     11518     12508     13888     16243     30875   |    |   |              |       |       |       |       | 1  |
| 59 10753 11518 12508 13888 16243 30875  |    |   |              |       |       |       |       |    |
| M. 84° 85° 86° 87° 88° 89°  | 59 | 10753                                   |              | 12508 |       |       |       |    |
|   | M. | 840                                     | 850          | 86°   | 870   | 880   | 89°   |    |
|   |    | *************************************** |              |       |       |       |       | ı  |

| 1 | L        |          | 201      | ****** | CALL I       |          | 1     |        |
|---|----------|----------|----------|--------|--------------|----------|-------|--------|
|   |          |          |          |        |              | ndreds   | of Ye | ars.   |
| 1 | l        |          |          |        | 100          | 200      | 300   | 400    |
| 1 | 1        |          |          |        | 500          | 600      | 700   | 800    |
| ł | l        |          |          |        | 900          | 1000     | 1100  | 1200   |
| J | l        |          |          |        | 1300         | 1400     | 1500  | 1600   |
| ١ | 1        |          |          |        | 1700         | 1800     | 1900  | 2000   |
| ١ | l        |          |          |        | 2100         | 2200     | 2300  | 2400   |
| ١ | i        |          |          |        | 2500         | 2600     | 2700  | 2800   |
| ١ | 1        |          |          |        | 2900         | 3000     | 3100  | 3200   |
| ١ | l        |          |          |        | 3300         | 3400     | 3500  | 3600   |
| 1 |          |          |          |        | 3700         | 3800     | 3900  | 4000   |
| ١ |          | Years    | ahor     | 70     | 4100         | 4200     | 4300  | 4400   |
|   |          |          | dreds    |        | C            | E        | G     | B.A    |
|   | 1        | 29       | 57       | 85     | В            | D        | F     | G      |
|   | 2        | 30       | 58       | 86     | A            | С        | E     | F      |
|   | 3        | 31       | 59       | 87     | G            | В        | D     | E.     |
| ٠ | 4        | 32       | 60       | 88     | F.E          | A.G      | C.B   | D.C    |
|   | 5        | 33       | 61       | 89     | D            | F        | Α     | В      |
|   | 6        | 34       | 62       | 90     | C            | E        | G     | A      |
|   | 7        | 35       | 63       | 91     | `B           | D        | F     | G      |
| 1 | 8        | 36       | 64       | 92     | A.G          | C.B      | E.D   | F.E    |
| ١ | 9        | 37       | 65       | 98     | F            | A        | C,    | . Ď    |
|   | 10       | 38       | 66       | 94     | E            | G        | В     | c      |
| 1 | 11       | 39       | 67       | 95     | _ <b>D</b> _ | _F_      | A     | В      |
|   | 12       | 40       | 68       | 96     | C.B          | E.D      | G.F   | A.G    |
|   | 13       | 41       | 69       | 97     | A            | C        | E     | F      |
|   | 14       | 42       | 70       | 98     | G            | В        | D     | E      |
|   | 15       | 43       | 71       | 99     | F            | A        | C     | D      |
|   | 16       | 44       | 72       |        | E.D          | G.F      | B.A   | C.B    |
|   | 17<br>18 | 45       | 78       | ŀ      | C            | E        | G     | A<br>G |
|   | 19       | 46<br>47 | 74       |        | В            | D        | F     | F      |
|   | 20       | 48       | 75       |        | A            | C        |       | E.D    |
| į | 21       |          | 76<br>77 | ١.     | G.F<br>E     | B.A<br>G | D.C   | C C    |
|   | 21       | 49<br>50 | 78       |        | D            | F        | B     | В      |
|   | 28       | 51       | 79       |        | C            | E        | G     | A      |
|   | 24       | 52       | 80       |        | B.A          | D.C      | F.E   | G.F    |
|   | 25       | 53       | 81       |        | G.A          | B        | D     | E      |
|   | 26       | 54       | 82       |        | F            | A        | ·c    | مّا    |
|   | 27       | 55       | 83       |        | E            | Ĝ        | В     | ١č     |
|   | 28       | 56       | 84       |        | D.C          | F.E      | A.G   | B.A    |
| 1 | =        |          |          |        |              |          |       |        |

#### TABLE XVI.

To find the Day of the Week answering to a given Day of the Month, and conversely.

| given Day of the M  | ont | h, a | DO  | con | ver | ery | •   |
|---------------------|-----|------|-----|-----|-----|-----|-----|
| Months.             | D   | OM   | NIC | AL  | LE  | TTI | RS. |
| January, October    | A   | В    | C   | D   | E   | F   | G   |
| Feb. March, Nov     | D   | E    | F   | G   | A   | В   | C   |
| April, July         | G   | A    | В   | C   | D   | E   | P   |
| May                 | В   | C    | D   | E   | F   | G   | A   |
| June                | E   | F    | G   | A   | В   | C   | D   |
| August              | С   | D    | E   | F   | G   | A   | B   |
| September, December | F   | G    | A   | В   | С   | D   | F   |
|                     | 1   | 2    | 3   | 4   | 5   | C   |     |
| ,                   | 8   | 9    | 10  | 11  | 12  | 15  | ì   |
|                     | 15  | 16   | 17  | 18  | 19  | 24  | 4   |
|                     | 22  | 23   | 24  | 3,  | 26  | 2.  | 1   |
|                     | 29  | 30   | 31  |     | ı   |     | 1   |

ΙX. New Style. fthe 365d Julian Parisel 5-Greg orin 365 Dipperence & ANT. \$ 131 gm 99.20. 200 331 add 1 dd 462 593 New Pufe Be in Hayd Die of Dates 593 724 853 he adopted AR 1248 Accountable treatises 1379 1570 1641 0 28 81 0 26 84 0 25 90 20 | 19 80 2 40 | 31 20 1 38 20 | 19 40 2 88 | 31 40 1 32 18 | 19 50 2 37 | 32 0 1 31 **9.**3 **0.**1 **0.0** 64 90 90 10 65

#### MERIDIONAL PARTS.

| M                    | 56°          | 57°          | 58°          | 59°          | 60°          | 61°          | 62°          | 63°          | 64°          | 65°               | 66°          | 67°          | 68°                   | 69°          | M.         |
|----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------------|--------------|--------------|-----------------------|--------------|------------|
| 0                    | 4074         | 4183         | 4294         | 4409         | 4527         | 4649         | 4775         | 4905         | 5039         | 5179              | 5324         | 5474         | 5631                  | 5795         | 0          |
| 1                    | 4076         | 4184         | 4296         | 4411         | 4529         | 4651         | 4777         | 4907         | 5042         | 5181              | 5326         | 5477         | 5633                  | 5797         | ŀ          |
| 2.                   | 4077         | 4186         | 4293         | 4413         |              | 4653         |              | 4909         |              |                   | 5328         | 5479         | 5636                  | 5800         | 2          |
| 3                    | 4079         | 4188         |              |              | 4533         | 4655         |              | 4912         |              |                   |              | 5482         | 5639                  | 5803         | 3          |
| 4                    | 4081         | 4190         |              | 4417         |              |              | 4784         | 4914         |              | 5188              | 5333         | 5484         |                       | 5806         | 4          |
| 5                    | 4083         | 4192         | 4304         | 4419         |              | 4660         |              | 4916         |              | 5191              | 5336         | 5487         | 5644                  | 5809         | 5          |
| 6                    | 4085         | 4194         | 4306         | 4421         | 4539         |              | 4788         | 4918         |              |                   |              | 5489         | 5647                  | 5811         | 6          |
| 8                    | 4086<br>4088 | 4195<br>4197 | 4308         | 4423<br>4425 | 4541<br>4543 |              | 4790<br>4792 | 4920<br>4923 |              | 5195              | 5341         | 5492         | 5650                  | 5814         | 7          |
| 9                    | 4090         | 4199         | 4309<br>4311 | 4427         | 4545         | 4668         |              | 4925<br>4925 | 5058<br>5060 | 5198              | 5343         | 5495         | 5652                  | 5817         | 8          |
|                      | 2030         | 7199         | 4311         | 7721         | 1343         | 1000         | 7137         | 4943         | 3000         | 5200              | 5346         | 5497         | 5655                  | 5820         | 9          |
| 10                   | 4092         | 4201         | 4313         | 4429         | 4547         | 4670         | 4796         | 4927         | 5062         | 5203              | 5348         | <i>55</i> 00 | 5658                  | 5823         | 10         |
| - 11                 | 4094         | 4203         | 4315         | 4431         | 4549         | 4672         |              | 4929         | 5065         | 5205              | 5351         | 5502         | 5660                  | 5825         | 11         |
| 12                   | 4095         | 4205         | 4317         | 4433         | 4551         | 4674         | 4801         | 4931         | 5067         | 5207              | 5353         | 5505         | 5663                  | 5828         | 12         |
| 13                   | 4097         | 4207         | 4319         | 4434         |              |              | 4803         | 4934         |              |                   | 5356         |              | 5666                  | 5831         | 13         |
| 14                   | 4099         | 4208         |              |              | 4555         | 4678         |              | 4936         |              |                   | <i>5</i> 358 |              |                       | 5834         |            |
| 15                   | 4101         | 4210         |              | 4438         |              | 4680         |              | 4938         |              |                   | 5361         | 5513         | 5671                  | 5837         | 15         |
| 16<br>17             | 4103         | 4212         | 4325         | 4440         |              | 4682         | 4809         | 4940         | 5076         | 5217              |              |              | 5674                  | 5839         | 16         |
| 18                   | 4104         | 4214         | 4327         | 4442<br>4444 |              | 4684         | 4811<br>4814 | 4943         | 5078         | 5219              | 5366         | 5518         | 5676                  | 5842         | 17         |
| 19                   | 4106<br>4108 | 4218<br>4218 | 4328<br>4330 | 4446         | 4564<br>4566 | 4687<br>4689 |              | 4945         | 5081         | 5222              | 5968         | 5520         | 5679                  | 5845         | 18         |
| -13                  | 4100         | 4210         | 4530         | 4440         | 4300         | 4009         | 4010         | 4947         | 5083         | 5224              | 5371         | 5523         | 5682                  | 5848         | 19         |
| 20                   | 4110         | 4220         | 4332         | 4448         | 4568         | 4691         | 4818         | 4949         | 5085         | 5226              | 5373         | 5526         | 5685                  | <i>5</i> 851 | 20         |
| 21                   | 4112         | 4221         | 4334         | 4450         | 4570         | 4693         |              | 4951         | 5088         | 5229              | 5376         | 5528         | 5687                  | 5854         | 21         |
| 22                   | 4113         | 4223         | 4336         | 4452         | 4572         |              | 4822         | 4954         | <i>5</i> 090 | 5231              | 5378         | 5531         | 5690                  | 5856         |            |
| 23                   | 4115         | 4225         | 4938         | 4454         | 4574         | 4697         |              | 4956         | 5092         | 5234              |              | 5533         | 5693                  | 5859         | 23         |
| 24                   | 4117         | 4227         | 4340         | 4456         | 4576         | 4699         | 4826         | <b>49</b> 58 | 5095         | 5236              |              | 5536         | 5695                  | 5862         |            |
| 25                   | 4119         | 4229         | 4342         | 4458         | 4578         | 4701         |              | 4960         | 5097         | 5238              |              | 5539         | 5698                  | 5865         | 25         |
| 26                   | 4121         | 4231         | 4344         | 4460         | 4580         | 4703         |              | 4963         | 5099         | 5241              |              | 5541         | 5701                  | 5868         | 26 .       |
| 27<br>28             | 4122         | 4232         | 4346         | 4462         | 4582         | 4705         | 4833         | 4965         | 5102         |                   | 5390         | 5544         | 5704                  | 5871         | 27         |
| 29                   | 4124<br>4126 | 4234<br>4236 | 4347         | 4464         | 4584         | 4707         | 4835         | 4967         | 5104         |                   | 5393         | 5546         | 5706                  | 5874         |            |
|                      | 4120         | 4230         | 4349         | 4466         | 4586         | 4710         | 4837         | 4969         | 5106         | 5248              | 5395         | 5549         | 5709                  | 5876         | 29         |
| so                   | 4128         | 4238         | 4951         | 4468         | 4588         | 4712         | 4839         | 4972         | 5108         | 5250              | 5398         | 5552         | 5712                  | 5879         | 30         |
| 31                   | 4130         | 4240         | 4353         | 4470         | 4590         | 4714         | 4842         | 4974         | 5111         | 5253              | 5401         | 5554         | 5715                  | 5882         | 31         |
| ,32                  | 4132         | 4242         | 4955         | 4472         | 4592         | 4716         | 4844         | 4976         | 5113         | 5255              | 5403         | 5557         | 5717                  | 5885         |            |
| 33                   | 4133         | 4244         | 4357         | 4474         | 4594         | 4718         | 4846         |              | 5115         | 5258              |              | 5559         | 5720                  | 5888         |            |
| 34                   | 4135         | 4246         | 4359         | 4476         | 4596         | 4720         | 4848         | 4981         | 5118         | 5260              |              | 5562         | 5723                  | 5891         | 34         |
| 35                   | 4137         | 4247         | 4361         | 4478         | 4598         | 4722         | 4850         | 4983         | 5120         | 5263              | 5411         | 5565         | 5725                  | 5894         | 35         |
| 36<br>37             | 4139         | 4249         | 4963         | 4480         | 4600         | 4724         | 4852         | 4985         | 5122         | 5265              | 5413         | 5567         | 5728                  | 5896         | 36         |
| 38                   | 4141         | 4251         | 4865         | 4482         | 4602         | 4726         | 4855         | 4987         | 5125         | 5267              | 5416         | 5570         | 5731                  | 5899         | 37         |
| 39                   | 4142<br>4144 | 4253<br>4255 | 4967         | 4484         | 4604         | 4728         | 4857         | 4990         | 5127         | 5270              | 5418         | 5573         | 5784                  | 5902         | 39         |
| 38                   | 4144         | *Z33         | 4369         | 4486         | 4606         | 4731         | 4859         | 4992         | 5129         | 5272              | 5421         | 5575         | 5736                  | 5905         | 39         |
| 40                   | 4146         | 4257         | 4370         | 4488         | 4608         | 4733         | 4861         | 4994         | 5132         | 5275              | 5423         | 5578         | 5739                  | 5908         | 40         |
| 41                   | 4148         | 4259         | 4372         | 4490         | 4610         | 4735         | 4863         | 4996         | 5134         | 5277              | 5426         | 5580         | 5742                  | 5911         | 41         |
| 42                   | 4150         | 4260         |              | 4492         | 4612         | 4737         | 4865         | 4999         | 5136         | 5280              | 5428         | 5583         | 5745                  | 5914         | 42         |
| 43                   | 4152         | 4262         | 4376         | 4494         | 4614         | 4739         | 4868         | 5001         | 5139         | 5282              | 5431         | 5586         | 5747                  | 5917         | 43         |
| 44                   | 4153         |              | 4378         | 4495         | 4616         | 4741         | 4870         | 5003         |              | 5284              | 5433         | 5588         | <i>5</i> 7 <i>5</i> 0 | 5919         | 44         |
| 45                   | 4155         |              | 4380         | 4497         | 4618         | 4749         | 4872         | 5005         | 5143         | 5287              | 5436         | 5591         | 5753                  | 5922         | 45         |
| <del>4</del> 6<br>47 | 4157         | 4268         | 4382         | 4499         | 4620         | 4745         | 4874         | 5008         | 5146         | 5289              | 5438         | 5594         | 5 <b>75</b> 6         | 5925         | 46         |
| 47                   | 4159         | 4270         | 4384         | 4501         | 4623         | 4747         | 4876         | 5010         | 5148         | 5292              | 5441         | 5596         | 5758                  | 5928         | 47         |
| 48<br>49             | 4161         | 4272         | 4386         | 4508         | 4625         | 4750         | 4879         | 5012         | 5151         | 5294              | 5443         | 5599         | 5761                  | 5981         | 48         |
| 73                   | 4162         | 4274         | 4388         | 4505         | 4627         | 4752         | 4881         | 5014         | 5159         | 5297              | <b>544</b> 6 | 5602         | 5764                  | 5934         | 49         |
| 50                   | 4164         | 427,5        | 4390         | 4507         | 4629         | 4754         | 4883         | 5017         | 5155         | 5299              | 5448         | 5604         | 5767                  | 5937         | <i>5</i> 0 |
| 51                   | 4166         | 4277         | 4392         | 4509         | 4631         | 4756         | 4885         | 5019         |              | 5301              | 5451         | 5607         | 5770                  | 5940         | 51         |
| 52                   | 4168         | 4279         | 4394         | 4511         | 4633         | 4758         | 4887         | 5021         |              | 5304              |              | 5610         | 5772                  | 5943         | 52         |
| 53                   | 4170         | 4281         | 4396         | 4513         |              | 4760         | 4890         |              | 5162         |                   | 5456         | 5612         | 5775                  | 5946         | 53         |
| 54                   | 4172         | 4283         |              | 4515         |              | 4762         |              | 5026         |              |                   | 5459         | 5615         | 5778                  | 5948         | 54         |
| 55                   | 4175         | 4285         | 4399         | 4517         |              | 4764         |              | 5028         | 5167         | <sub>/</sub> 5311 |              | 5617         | 5781                  | 5951         | 55         |
| 56                   | 4175         | 4287         | 4401         | 4519         | 4641         | 4766         | 4896         | 5030         | 5169         |                   | 5464         | 5620         | 5783                  | 5954         | 56         |
| - 57                 | 4177         | 4289         | 4403         | 4521         | 4643         | 4769         | 4898         | 5033         | 5172         |                   | 5466         | 5623         | 5786                  | 5957         | 57         |
| 58                   | 4179         | 4291         | 4405         | 4523         | 4645         | 4771         | 4901         | 5035         | 5174         | 5319              |              | 5625         | 5789                  | 5960         | 58         |
| 59                   | 4181         | 4292         | 4407         | 4525         | 4647         | 4773         | 4903         | 5037         | 5176         | 5321              | 5471         | 5628         | 5792                  | 5963         | 59         |
| M.                   | 56°          | 57°          | 580          | 590          | 600          | 61°          | 62°          | 63°          | 64°          | 65°               | 660          | 67°          | 68°                   | 69°          | M.         |
|                      |              |              |              |              |              |              |              |              | <u> </u>     |                   |              | .,,          |                       | <u> </u>     |            |

### MERIDIONAL PARTS.

|          |              |              |              |              |              |              |              |               |                      |              |              |      | -            |                         |            |
|----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|----------------------|--------------|--------------|------|--------------|-------------------------|------------|
| M.       | 700          | 71°          | 720          | 73°          | 74°          | 75°          | 76°          | 77°           | 780                  | 79°          | 80°          | 81°  | 82°          | 83°                     | M.         |
| 0        | 5966         | 6146         | 6335         | 6534         | 6746         | 6970         | 7210         | 7467          | 7745                 | 8046         | 8375         | 8739 | 9145         | 9606                    | 0          |
| 1        | 5969         | 6149         | 6338         | <b>65</b> 38 | 6749         | 6974         | 7214         | 7472          | 7749                 | 8051         | 8381         | 8745 | 9158         | 9614                    | 1          |
| -2       | 5972         | 6152         | 6341         | 6541         | 6753         | 6978         | 7218         | 7476          | 7754                 | 8056         | 8587         | 8752 | 9160         | 9622                    | 2          |
| 3        | 5975         | 6155         | 6345         | 6545         | 6757         | 6982         | 7222         | 7481          | 7759                 | 8061         | 8393         | 8758 | 9167         | 9631                    | 3          |
| 4        | 5978         | 6158         | 6348         | 6548         | 6760         | 6986         | 7227         | 7485          | 7764                 | 8067         | 8398         | 8765 | 9174         | 9639                    | 4          |
| 5        | 5981         | 6161         | 6851         | 6552         | 6764         | 6990         | 7231         | 7490          | 7769                 | 8072         | 8404         | 8771 | 9182         | 9647                    | 5          |
| 6        | 5984         | 6164         | 6354         | 6555         | 6768         | 6994         | 7235         | 7494          | 7774                 | 8077         | 8410         | 8778 | 9189         | 9655                    | 6          |
| 7        | 5986         | 6167         | 6358         | 6558         | 6771         | 6997         | <b>72</b> 39 | 7498          | 7778                 | 8083         | 8416         | 8784 | 9196         | 9664                    | 7          |
| . 8      | 5989         | 6170         | 6361         | 6562         | 6775         | 7001         | 7243         | 7503          | 7783                 | 8088         | 8422         | 8791 | 9203         | 9672                    | 8          |
| 9        | 5992         | 6173         | 6364         | 65 <b>65</b> | 6779         | 7005         | 7247         | 7507          | 7788                 | 8093         | 8427         | 8797 | 9211         | 9630                    | 9          |
| 10       | 5995         | 6177         | 6367         | 6569         | 6782         | 7009         | 7252         | 7512          | 7793                 | 8099         | 8433         | 8804 | 9218         | 9689                    | 10         |
| 11       | 5998         | 6180         |              | 6572         | 6786         | 7013         | 7256         | 7516          | 7798                 | 8104         | 8439         | 8810 | 9225         | 9697                    | 11         |
| 12       | 6001         | 6183         | 6374         |              | 6790         | 7017         | 7260         | 7521          | 7808                 | 8109         | 8445         | 8817 | 9233         | 9706                    | 12         |
| 13       | 6004         | 6186         | 6877         | 6579         | 6793         | 7021         | 7264         | 7.525         | 7808                 | 8115         | 8451         | 8823 | 9240         | 9714                    | 13         |
| 14       | 6007         | 6189         | 6380         |              | 6797         | 7025         | 7268         | 7530          | 7813                 | 8120         | 8457         | 8830 | 9248         | 9723                    | 14         |
| 15       | 6010         | 6192         | 6384         | 6586         | 6801         | 7029         | 7273         | 7535          | 7817                 | 8125         | 8463         | 8836 | 9255         | 9731                    | 15         |
| 16       | 6013         | 6195         | 6387         | 6590         | 6804         | 7033         | 7277         | 7539          | 7822                 | 8131         | 8469         | 8843 | 9262         | 9740                    | 16         |
| 17       | 6016         | 6198         | 6390         | 6593         | 6808         | 7037         | 7281         | 7544          | 7827                 | 8136         | 8474         | 8849 | 9270         | 97-18                   | 17         |
| 18       | 6019         | 6201         | 6394         | 6597         | 6812         | 7041         | 7285         | 7548          | 7832                 | 8141         | 8480         | 8856 | 9277         | 9757                    | 18         |
| 19       | 6022         | <b>62</b> 05 | 6397         | 6600         | 6815         | 7045         | 7289         | <b>755</b> 3  | 7837                 | 8147         | 848%         | 8863 | 9285         | 9765                    | 19         |
| 90       | 6025         | 6208         | 6400         | 6608         | 6819         | 7048         | 7294         | 7557          | 7842                 | 8152         | 8492         | 9960 | 9292         | 9774                    | 20         |
| 21       | 6028         | 6211         | 6403         | 6607         | 6823         | 7052         | 7298         | 7562          | 7847                 | 8158         | 8498         |      | 9300         | 9783                    | 21         |
| 22       | 6031         | 6214         | 6407         | 6610         | 6826         | 7056         | 7302         | 7566          | 7852                 |              | 8504         | 8883 | 9307         | 9791                    | 22         |
| 23       | 6034         | 6217         | 6410         | 6614         | 6830         | 7060         | 7306         | 7571          | 7857                 | 8168         | 8510         | 8889 |              | 9800                    | 23         |
| 24       | 6037         | 6220         | 6413         | 6617         | 6834         | 7064         | 7311         | 7576          | 7862                 | 8174         | 8516         |      | 9322         | 9809                    | 24         |
| 25       | 6040         | 6223         | 6417         | 6621         | 6838         | 7068         | 7315         | 7580          | 7867                 | 8179         | 8522         |      | 9830         | 9817                    | 25         |
| 26       | 6043         | 6226         | 6420         | 6624         | 6841         | 7072         | 7319         | 7585          | 7872                 | 8185         | 8528         | 8909 |              | 9826                    | 26         |
| 27       | 6046         | 6230         | 6423         | 6628         | 6845         | 7076         | 7323         | 7589          | 7877                 | 8190         |              |      | 9345         | 9835                    | 27         |
| 28       | 6049         | 6233         | 6427         | 6631         | 6849         | 7080         | 7328         | 7594          | 7882                 | 8196         |              |      | 9358         | 9844                    | 28         |
| 29       | 6052         | 6236         | 6430         | 6635         | 6853         | 7084         | 7832         | 7599          | 7887                 | 8201         |              | 8930 |              | 9852                    | 29         |
| 30       | 6055         | 0000         |              | - ccao       | <b>685</b> 6 | 7000         | Food         | 7000          |                      |              |              |      |              | 0001                    |            |
| 31       | 6055<br>6058 | 6239         | 6433         | 6639<br>6642 | 6860         | 7088         | 7336         | 7603          | 7892                 | 8207         | 8552         | 8936 | 9368         | 9861                    | 30         |
| 32       | 6061         | 6242         | 6437<br>6440 | 6646         |              |              | 7941         | 7608          | 7897                 | 8212         | 8558         | 8943 |              | 9870                    | 31<br>32   |
| 33       | 6064         | 6245<br>6249 | 6443         | 6649         | 6868         | 7096<br>7100 | 7345<br>7349 | 7612<br>7617  | 7902                 | 8218         | 8565         |      | 9383<br>9391 | 9879<br>9888            | 33         |
| 34       | 6067         | 6252         | 6447         | 6653         |              | 7104         | 7353         | 7622          | 7907                 | 8223<br>8229 | 8571         | 8957 | 9399         | 9897                    | 34         |
| 35       | 6070         | 6255         | 6450         | 6656         | 6875         | 7108         | 7358         | 7626          | 791 <i>2</i><br>7917 | 8234         | 8577<br>8583 | 8970 |              | 9906                    | 35         |
| 36       | 6073         | 6258         | 6453         | 6660         | 6879         | 7112         | 7362         | 7631          | 7922                 | 8240         | 8589         | 8977 |              | 9915                    | 86         |
| 37       | 6076         | 6261         | 6457         | 6663         | 6889         | 7116         | 7366         | 7636          | 7927                 | 8245         | 8595         |      | 9422         | 9924                    | 37         |
| 38       | 6079         | 6264         | 6460         | 6667         | 6886         | 7120         | 7371         | 7640          | 7932                 | 8251         | 8601         | 8991 |              | 9933                    | 38         |
| 39       | 6082         | 6268         | 6463         | 6670         | 1            | 7124         | 7375         | 7645          | 7937                 | 8256         | 8607         | 8998 |              | 9942                    | 39         |
| 40       |              |              |              |              |              |              | '            |               |                      |              |              |      |              |                         |            |
| 40       | 6085         | 6271         | 6467         | 6674         | 6894         | 7128         | 7379         | 7650          | 7942                 | 8262         | 8614         |      | 9445         |                         | 40         |
| 41       | 6038         | 6274         | 6470         | 6677         | 6898         | 7132         | 7384         | 7654          | 7948                 | 8267         | 8620         |      | 9453         | 9960                    |            |
| 42 43    | 6091         | 6277         | 6473         | 6681         | 6901         | 7136         | 7388         | 7659          | 7953                 | 8273         | 8626         |      | 9461         | 9969                    | 42         |
| 44       | 6094         | 6280         | 6477         | 6685         | 6905         | 7140         | 7392         | 7664          | 7958                 | 8279         | 8632         |      | 9469         |                         | 43         |
| 45       | 6097         | 6283         | 6480         | 6688         | 6909         | 7145         | 7397         | 7668          | 7963                 | 8284         | 8638         |      | 9477         | 9987                    | 44         |
| 46       | 6100         | 6287         | 6483         |              |              | 7149         | 7401         | 7 <b>6</b> 73 | 7968                 | 8290         | 8644         |      | 9185         |                         | 45         |
| 47       | 6108<br>6106 | 6290         | 6487         | 6695         | 6917<br>6920 | 7153         | 7406         | 7678          | 7973                 | 8295         |              |      |              | 10005                   | 46<br>47   |
| 48       |              | 6298         | 6490         | 6699         |              | 7157         | 7410         | 7683          | 7978                 | 8301         | 8657         |      |              | 10015                   | ı          |
| 49       | 6109<br>6112 | 6296<br>6299 | 6494<br>6497 | 6702<br>6706 | 1            | 7161<br>7165 | 7414<br>7419 | 7687<br>7692  | 7983<br>7989         | 8907<br>8312 | 8668         |      |              | 10024<br>100 <b>3</b> 3 | 48<br>49   |
| !        | <u>_</u> .   | 0299         | 0491         | 0700         | 0320         | 7103         | 7719         | 7692          | 7909                 | 0312         | 8669         | 9067 | 9317         | 10033                   |            |
| 50       | 6115         | 6303         | 6500         |              |              |              | 7423         |               |                      | 8518         | 8676         |      |              | 10049                   | 50         |
| 51       | 6118         |              | 6504         |              | 6936         |              | 7427         |               | 7999                 |              | 8682         | 9081 | 9533         | 10052                   | 51         |
| 52       | 6121         |              | 6507         |              | 6940         | ,            | 7432         |               | 8004                 |              |              | 9088 | 9541         | 10061                   | 52         |
| 58       | 6124         |              | 6511         |              | 6943         |              | 7436         | 7711          |                      | 8335         | <b>2695</b>  |      |              | 10071                   | 53         |
| 54<br>55 | 6127         | 6315         | 6514         |              |              |              | 7441         | 7716          | 8014                 |              | 8701         |      |              | 10080                   |            |
| 56       | 6130         | 6319         | 6517         | 6728         |              |              | 7445         |               | 8020                 | 8347         |              |      |              | 10089                   |            |
| 57       | 6133         | 6322         | 6521         | 6731         |              |              | 7449         | 7725          | 8025                 | 8352         |              |      |              | 10099                   |            |
| 58       | 6136         | 6325         | 6524         | 6735         |              |              | 7454         |               | 8030                 | 8358         | 8720         |      |              | 10108                   | 57         |
| 59       | 6140<br>6148 | 6328<br>6332 | 6528<br>6531 | 6738<br>6742 |              | 7202         |              |               | 8035                 | 8364         | 8726         |      |              | 10118                   | <i>5</i> 8 |
|          |              |              |              |              |              |              |              | 7740          | 8040                 |              | 1            |      |              | 10127                   |            |
| M.       | 700          | 710          | 720          | 730          | 740          | 750          | 7601         | 770           | 780                  | 790          | 80° i        | 810  | د28 ا        | 1 880                   | M          |
| _        |              |              |              |              |              |              |              |               |                      |              |              |      |              |                         |            |

| Depres                           |   | 148]<br>Dip of th                                      |                            |                            | erent I                          |                            | es fr                                   | om t                                      | he                           | _          | Semi-                          | XXII.  |
|----------------------------------|---|--|----------------------------|----------------------------|----------------------------------|----------------------------|---|---|------------------------------|------------|--------------------------------|--|
| Height<br>of the<br>Eye.         | Dip.                                    | Dist.of land<br>in<br>Sea Miles.                       | Heig                       | Obs                        |                                  | bove t                     | he Se                                   | 35  | feet.<br>40                  | Month      | Day.                           | Sun's<br>Semi-diam.                                |
| 1ft.<br>2<br>3<br>4<br>5         | 1'.0<br>1.4<br>1.7<br>1.9<br>2.1        | 0 ¼<br>0 ½<br>0 ½<br>1 0 ¼<br>1 0                      | 11'<br>6<br>4<br>4<br>3    |                            | 7 22                             | 56'<br>28<br>19<br>15      | 68'<br>34<br>23<br>17                   | 79'<br>39<br>27<br>20<br>16               | 50'<br>45'<br>30<br>23<br>19 | January.   | 1<br>7<br>13<br>19<br>25       | 16' 19"<br>16 19<br>16 19<br>16 18<br>16 17        |
| 6<br>7<br>8<br>9<br>10           | 2.3<br>2.5<br>2.7<br>2.9<br>3.0         | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | 3<br>2<br>2<br>2           | 3<br>3<br>3                | 5 6<br>5 6<br>4 5                | 10<br>8<br>7<br>6          | 11<br>10<br>8<br>7                      | 14<br>11<br>9<br>8                        | 15<br>12<br>10<br>8          | February.  | 1<br>7<br>13<br>19<br>25       | 16 16<br>16 15<br>16 14<br>16 13<br>16 12          |
| 11<br>12<br>13<br>14             | 3.2<br>3.3<br>3.4<br>3.6                | 3 ½<br>4 0<br>5 0<br>6 0                               | 2 2 2 2                    | 3                          | 4   5<br>4   4<br>4   4<br>4   4 | 5 5 5                      | 6<br>6<br>5<br>5                        | 7<br>7<br>6<br>6                          | 7<br>7<br>6<br>6             | March.     | 1<br>7<br>13<br>19<br>25       | 16 10<br>16 9<br>16 7<br>16 6<br>16 4              |
| 15<br>16<br>17<br>18<br>19       | 3.7°<br>3.8<br>4.0<br>4.1<br>4.2<br>4.3 |  | 7                          | 'ABL                       | E XX                             |                            |   |   |                              | April      | 1<br>7<br>13<br>19<br>25       | 16 2<br>16 1<br>15 59<br>15 57<br>15 56            |
| 21<br>22<br>23<br>24             | 4.4<br>4.5<br>4.6<br>4.7                | ,<br>OF  | NTA<br>DIAME               | I'H <b>e</b>               |                                  | May.                       | 1<br>7<br>13<br>19<br>25                | 15 54<br>15 58<br>15 59<br>15 51<br>15 50 |                              |            |                                |  |
| 25<br>26<br>28<br>30<br>35       | 4.8<br>4.9<br>5.0<br>5.2<br>5.6         | woons .  | <u> </u>                   | Iorizon                    |                                  | i-diam                     |   |   |                              | June.      | 1<br>7<br>13<br>19             | 15 49<br>15 48<br>15 47<br>15 47                   |
| 40<br>45<br>50<br>55<br>60<br>65 | 6.0<br>6.4<br>6.7<br>7.1<br>7.4<br>7.7  | App. Alt.  C <sup>o</sup> 3 6 9 12                     | 0"<br>0<br>1<br>2<br>3     | 0"<br>0<br>1<br>2<br>3     | 15' 30"<br>1<br>2<br>2           | 0"<br>1<br>2<br>2<br>3     | -                                       | y'  <br>1<br>2<br>3                       | 0" 1 2 3 4                   | July.      | 25<br>1<br>7<br>18<br>19<br>25 | 15 47<br>15 47<br>15 47<br>15 47<br>15 48<br>15 48 |
| 70<br>75<br>80<br>90<br>100      | 8.0<br>8.2<br>8.5<br>9.0<br>9.5         | 15<br>18<br>21<br>24<br>27                             | 4<br>4<br>5<br>5           | 4<br>4<br>- 5<br>6<br>6    | 4<br>5<br>6<br>6                 | 4<br>5<br>6<br>7           | 2 2                                     | 5 6                                       | 5<br>6<br>7<br>7<br>8        | August.    | 1<br>7<br>13<br>19<br>25       | 15 49<br>15 50<br>15 51<br>15 52<br>15 53          |
| 110<br>120<br>130<br>140<br>150  | 10.0<br>10.5<br>10.9<br>11.3<br>11.7    | 30<br>33<br>36<br>39<br>42                             | 7<br>7<br>8<br>8<br>9      | 7<br>8<br>9<br>9           | 8<br>8<br>9<br>10<br>10          | 8<br>9<br>10<br>10<br>11   | 10<br>10<br>10<br>11                    | 0   | 9<br>10<br>11<br>12<br>12    | September. | 1<br>7<br>13<br>19<br>25       | 15 55<br>15 56<br>15 58<br>15 59<br>16 1           |
| 160<br>170<br>180<br>190<br>200  | 12.0<br>12.4<br>12.8<br>13.1<br>13.5    | 45<br>48<br>51<br>54<br>57                             | 9<br>10<br>10<br>11        | 10<br>11<br>11<br>12<br>12 | 11<br>12<br>12<br>13<br>13       | 12<br>12<br>13<br>13<br>14 | 1:                                      | 3<br>4<br>4                               | 13<br>14<br>14<br>15<br>16   | October.   | 1<br>7<br>13<br>19<br>25       | 16 3<br>16 4<br>16 6<br>16 8<br>16 9               |
| 210<br>220<br>230-<br>240<br>250 | 13.8<br>14.1<br>14.4<br>14.7<br>15.1    | 60<br>63<br>66<br>69<br>72                             | 12<br>12<br>12<br>13<br>13 | 13<br>13<br>13<br>14<br>14 | 14<br>14<br>14<br>15<br>15       | 14<br>15<br>15<br>15<br>16 | 1.<br>10<br>10<br>10                    | 6<br>6                                    | 16<br>17<br>17<br>17<br>18   | November.  | 1<br>7<br>13<br>19<br>25       | 16 11<br>16 13<br>16 14<br>16 15<br>16 16          |
| 260<br>270<br>280<br>290<br>300  | 15.4<br>15.7<br>16.0<br>16.2<br>16.5    | 75<br>78<br>81<br>84<br>90                             | 13<br>13<br>13<br>13       | 14<br>14<br>14<br>14<br>14 | 15<br>18<br>15<br>15<br>16       | 16<br>16<br>16<br>16<br>16 | 111111111111111111111111111111111111111 | 7<br>7<br>8                               | 18<br>18<br>18<br>19         | December.  | 1<br>7<br>19<br>19<br>25       | 16 17<br>16 18<br>16 18<br>16 19<br>16 19          |

### TABLE XXIV:

### DECLINATION OF THE SUN, FOR THE YEAR 1803,

(or 1807, 1811, 1815,)

#### BEING THE FIRST BEFORE LEAP YEAR.

| ===  |              |         |            |         | M     | IONTI         | HS.`         |         |         |        |        |               |
|------|--------------|---------|------------|---------|-------|---------------|--------------|---------|---------|--------|--------|---------------|
|      | Jan.         | Feb.    | March Ap   | ril. Ma | ٠-,٠  | June.         | July.        | Aug.    | Sept.   | Octr.  | Nov.   | Dec.          |
| days | South.       | South.  | S. & N. No | rth Nor | th.   | North.        | North.       | North-  | N. & S. | South. | South. | South.        |
| 1    | 230 4/       | 17° 17′ | 70 49/ 40  | 17/ 14° | 52/ 2 | 21°58′        | 232 11       | 18° 14' | 8° 34′  | 2° 55′ | 140 14 | 21044         |
| 2    | 22 59        | 17 0    | 7 27 4     | 40 15 1 | 0 9   | 22 6          | 23 7         | 17 59   | 8 12    | 3 18   | 14 33  | 21 53         |
| 3    | 22 54        | 16 42   | 7 4 5      | 3 15 2  | 8 3   | 22 14         | 23 3         | 17 44   | 7 50    | 3 41   | 14 52  | 22 <b>2</b>   |
| 4    | 22 48        | 16 25   | 6 41 5     | 26 15 4 | 16    | 22 22         | 22 58        | 17 28   | 7 28    | 4 5    | 15 14  | 22 11         |
| 5    | 22 42        | 16 7    | 6 18 5     | 49 16   | 3 3   | 22 29         | 22 53        | 17 12   | 7 6     | 4 28   | 15 80  | 22 19         |
| 6    | 22 35        | 15 49   | 6 55 6     | 12 16 2 | 21    | 22 36         | 22 48        | 16 56   | 6 44    | 4 51   | 15 48  | 22 27         |
| 7    | <b>22</b> 28 | 15.30   | 5 31 6     |         | 38    | 22 42         | 22 42        | 16 39   | 6 21    | 5 14   | 16 6   | 22 3 <b>4</b> |
| 8    | 22 20        | 15 11   | 5 8 6      |         | 54    | 22 48         | 22 35        | 16 23   | 5 59    |        | 16 24  | 22 41         |
| 9    | 22 12        | 14 52   | 4 45 7     |         |       |               | 22 29        | 16 6    | 5 36    | 6 0    | 16 41  | 22 47         |
| 10   | 22 4         | 14 93   | 4 21 7     | 42 17 9 | 26    | 22 58         | 22 22        | 15 48   | 5 14    | 6 23   | 16 59  | 22 53         |
| 11   | 21 55        | 14 14   | 3 58 8     | 4 17    |       |               | 22 14        | 15 31   | 4 51    | 6 46   | 17 16  | 22 58         |
| 12   | 21 46        | 13 54   | 3 34 8     |         |       |               | 22 6         | 15 13   | 4 28    | 7 9    | 17 32  | 23 3          |
| -13  | 21 36        | 13 34   | 3 11 8     |         |       |               | <b>21 58</b> | 14 55   | 4 5     | 7 31   | 17 49  | 23 8          |
| 14   | 21 26        | 13 14   | 2 47 9     |         |       | 23.15         | 21 49        | 14 37   | 3 42    | 7 54   | 18 5   | 23 12         |
| 15   | 21 15        | 12.54   | 2 23 9     |         |       |               | 21 40        | 14 18   | 3 194   | 8 16   | 18 20  | 23 16         |
| 16   | 21 4         | 12 33   | 2 0 9      |         |       |               | 21 31        | 14 0    | 2 56    | 8 38   | 18 36  | 23 19         |
| 17   | 20 53        | 12 12   | 1 36 10    |         |       | 23 23         | 21 21        | 13 41   | 2 33    | 9 1    | 18 51  | 23 22         |
| 18   | 20 41        | 11 51   | 1 12 10    |         |       | 23 25         | 21 11        | 13 21   | 2 9     | 8 23   | 19 6   | 23 .24        |
| 19   | 20,28        | 11 30   | 0 49 10    |         |       |               | 21 1         | 13 2    | 1 46    | 9 45   | 19 20  | 23 26.        |
| 20   | 20 16        | 11 9    | 0 25 11    | 17 19   | 50    | 23 27         | 20 50        | 12 43   | 1 23    | 10 6   | 19 34  | 23 27         |
| 21   | 20 3         | 10 47   | 0 1 11     | 38 20   | 3     | 23 28         | 20 39        | 12 23   | 0 59    | 10 28  | 19 48  | 23 28         |
| 22   | 19 50        | 10 25   | 0 22n 11   | 58 20   | 15    | 23 28         | 20 27        | 12 3    | 0 36    | 10 49  | 20 1   | 23 28         |
| 23   | 19 86        | 10.4    | 0 46 12    | 18 20 9 | 27    | 23 28         | 20 15        | 11 43   |         | 11 11  | 20 14  | 23 28         |
| 24   | 19 22        | 9 42    | 1 10 12    | 38 20 3 | 39    | 23 27         | 20 3         | 11 23   | 0 118   | 11 32  | 20 27  | 23 27         |
| 25   | 19 7         | 9 19    | 1 33 12    | 58 20 3 | 50    | 23 26         | 19 51        | 11 2    |         | 11 53  | 20 39  | 23 26         |
| 26   | 18 52        | 8 57    | 1 57 13    | 18 21   |       | 23 25         | 19 38        | 10 41   |         | 12 14  | 20 51  | 23, 25        |
| 27   | 18 37        | 8 35    | 2 20 13    |         | 11    | 23 23         | 19 25        | 10 20   |         | 12 34  | 21 2   | 23 23         |
| 28   | 18 22        | 8 12    | 2 44 13    |         | 21    |               | 19 11        | 9 59    | 1 45    |        | 21 13  | 23 20         |
| 29   | 18 6         | l       | 3 7 14     |         |       |               | 18 57        | 9 38    | 2 8     |        | 21 24  | 23 17         |
| 30   | 17 50        | l       |            |         |       | 23 1 <i>5</i> | 18 43        | 9 17    | 2 31    | 13 35  | 21 34  | 23 14         |
| 81   | 17 34        | 1       | 3 54       | 21 .    | 50 I  |               | 18 29        | 8 55    | 1       | 13 54  | 1      | 23 10         |

### TABLE XXV.

| Periods            |            |     |      | •    | •    | 1          | O N  | N T   | H S        | •   |      |      | •     |     |     | Periods            |
|--------------------|------------|-----|------|------|------|------------|------|-------|------------|-----|------|------|-------|-----|-----|--------------------|
| cf                 |            | JA  | NUA  | RY.  | .    |            | FEB  | RUA   | RY.        |     |      | M    | ARC   | H.  |     | of '               |
| complete<br>Years. |            |     | Days | 3.   |      |            |      | Days. |            |     |      |      | Days. |     |     | complete<br>Years. |
| -                  | 1          | 7   | 13   | 19   | 25   | 1          | 7    | 13    | 19         | 25  | 1    | · 7  | 18    | 19  | 25  | ,                  |
| . 4                | 0'.1       | - 0 | 0'.3 | 0'.4 | 0'.4 | <br>0'.5   | 0'.5 | -     | -          | ~ . | 0'.7 | 0'.7 | 0.7   | 0.7 | +   |                    |
| 8                  | 0.3        | 0.4 | 0.6  |      | 0.8  | 1.0        | 1.1  | 1.2   | 1.2        | 1.3 | 1.3  | 1.4  | 1.4   | 1.4 | 1.4 | 8                  |
| 12<br>16           | 0.4<br>0.6 |     |      | 1.1  | 1.3  | 1.5<br>2.0 |      | 1.7   | 1.9<br>2.5 |     |      | 2.1  |       | 2.1 | 2.1 | 12<br>16           |
|                    | 0.7        | 1.1 | 1.5  | 1.8  | 2.1  |            | ,2.7 |       |            |     |      | 3.5  | 3.5   | 3.6 | 3.6 | 20                 |

#### DECLINATION OF THE SUN, FOR THE YEAR 1804,

(or 1808, 1812, 1816,) / ///

### BEING LEAP YEAR.

| ,       |          |           |     |            |      |      | _  |            |     |            | MO       | NT   | HS.        |                  |                 |      |          |            |     | _               |          |     |     |          |
|---------|----------|-----------|-----|------------|------|------|----|------------|-----|------------|----------|------|------------|------------------|-----------------|------|----------|------------|-----|-----------------|----------|-----|-----|----------|
|         | Ja       | n.        | F   | eb.        | Ma   | ırch | A  | priľ.      | M   | ay.        | Ju       | ne.  | Ju         | l <del>y</del> . | A               | ug.  | Se       | ept.       | 0   | ctr.            | Ņ        | ov. | De  | ec.      |
| days    | Sou      | th.       | Sou | th.        | S. & | k N. | No | rth.       | No  | rth.       | No       | rth. | No         | rth.             | No              | rth. | N.       | & S.       | So  | uth.            | So       | uth | Sou | ith.     |
| 1       | 230      | 5'        | 170 | 21         | 70   | 32   | 40 | 35         | 15° | 6'         | 220      | 4    | 23°        | 8′               | 1S <sup>c</sup> | 3'   |          | 17'        |     |                 |          | 29  |     | 51'      |
| 2       | 23       |           | 17  | 4          | 7    | 9    | 4  | 58         | 15  | 24         |          |      | 23         |                  | 17              | 47   |          | 55         | 3   |                 |          | 48  | 22  | 0        |
| ્ 3     |          | 55.       | 16  |            | 6    | 46   | 5  | 21         |     | 42         | 22       |      | 22         |                  | 17              | 32   | 7        | 33         | 3   |                 | 15       | 7   | 22  | 9        |
| 4       |          | 50        | 16  | 29         | 6    | 23   | 5  | 44,        | 15  | 59         |          |      | 22         |                  | 17              | 16   | 7        | 11         | 4   |                 | 15       | 25  | 22  | 17       |
| 5       |          | 44        | 16  | 11         | 6    | 0    | 6  | 6          | 16  | 16         |          |      | <b>2</b> 2 |                  | 17              | 0    | 6        | 49         | 4   |                 | 15       | 44  | 22  | 25       |
| 6       | 22       |           | 15  | 53         | 1 -  | 37   | 6  | 29         |     | 33         |          |      | 22         | 43               | 16              | 43   | 6        | 27         | 5   |                 | 16       | 2   | 22  | 32       |
| 7       |          |           | 15  | 35         | 5    | 14   | 6  | 52         |     | 50         |          |      | 22         |                  | 16              | 27   | 6        | 4          | 5   |                 | 16       | 20  | 22  | 39       |
| 8       | 22       | _         |     | 16         | 4    | 50   | 7  | 14         | 17  | 7          |          |      | 22         | 1                |                 | 10   | 5        | 42         | 5   |                 |          | 37  |     | 45       |
| 9<br>10 | 22<br>22 | 14<br>6   | 14  | <b>57</b>  | 4    | 27   | 7  | 37         | 17  | 25         |          |      | 22         |                  |                 | 53   |          | 19.<br>56  | 6   | 18<br><b>40</b> | 16<br>17 | 12  |     | 51<br>57 |
| 10      | 22       | ь         | 14  | 36         | 4    | 3    | 1. | 59         | 1.7 | 39         | 23       | 2    | 22         | 16               | 15              | 35   | 1        | <i>3</i> 0 | 0   | <del>-1</del> 0 | 11       | 12  | ZZ  | 31       |
| 11      | 21       | 57        | 14  | 18         | 3    | 40   | 8  | 21         | 17  | 54         | 23       | 6    | 22         | 8                | 15              | 17   | 4        | 33         | 7   | 3               | 17       | 28  | 23  | 2        |
| 12      | 21       | 48        | 13  | 59         | 3    | 16   | 8  | 43         | 18  | 9          | 23       | 10   | 22         | 0                | 14              | 59   | 4        | 10         | 7   | 26              | 17       | 45  | 23  | 7        |
| . 13    | 21       | 38        | 13  | 39         | 2    | 53   | 9  | 5          | 18  | 24         | 23       |      | 21         | 51               | 14              | 41   | 3        | 47         | 7   | 48              | 18       | 1   | 23  | 11       |
| 14      | 21       | 28        | 13  | 19         | 2    | 29   | 9  | 26         | 18  | 39         | 23       | 17   | 21         | 42               | 14              | 23   | 3        | 24         | 8   | 11              |          | 17  | 23  | 15       |
| 15      | 21       | 18        | 12  | 58         | 2    | 5    | 9  | <b>4</b> 8 | 18  | <b>5</b> 3 | 23       | 20   | 21         | 33               | 14              | 4    | 3        | 1          | 8   | 33              | 18       | 32  | 23  | 18       |
| 16      | 21       | 7         | 12  | 38         | 1    | 42   | 10 | 9          | 19  | 7          | 23       | 22   | 21         |                  | 13              | 45   | 2        | 38         | 8   | 55              |          | 47  | 23  | 21       |
| 17      |          |           | 12  | 17         | 1    | 18   | 10 | 30         | 19  | 21         | 23       | 24   | 21         |                  | 13              | 26   | 2        | 15         | 9   | 17              | 19       | 2   | 23  | 23       |
| 18      |          | 44        | 11  | 56         | 0    | 54   | 10 | 51         | 19  | 34         | 23       | 26   | 21         |                  | 13              | 7    | 1        | <b>52</b>  | 9   | 3 <b>9</b>      | 19       | 16  | 23  | 25       |
| 19      | 20       |           | 11  | 35         | 0    | 31   | 11 | 12         | 19  | 47         | 23       | 27   | 20         |                  | 12              | 48   | 1        | 28         | 10  | 1               | 19       | 31  |     | 26       |
| 20      | 20       | 19        | 11  | 14         | 0    | 7    | 11 | <b>3</b> 3 | 20  | 0          | 23       | 28   | 20         | 41               | 12              | 28   | 1        | 5          | 10  | 23              | 19       | 44  | 23  | 27       |
| 21      | 20       | •6        | 10  | 52         | 0    | 17N  | 11 | 53         | 20  | 12         | 23       | 28   | 20         | 30               | 12              | 8    | 0        | 42         | 10  | 44              | 19       | 58  | 23  | 28       |
| 22      | 19       | 53        | 10  | 31         | 0    | 40   | 12 | 13         | 20  | 24         | 23       | 28   | 20         |                  | 11              | 48   | 0        | 18         | 11  | 5               | 20       | 11  | 23  | 28       |
| 23      | 19       | S9        | 10  | 9          | 1    | 4    | 12 | <b>3</b> 3 | 20  | 36         | 23       | 27   | 20         | 6                | 11              | 28   | 0        | 5S         | 11  | 27              | 20       | 23  | 23  | 27       |
| 24      | 19       | 25        | 9   | 47         | 1    | 28   | 12 | 53         | 20  | 47         | 23       | 26   | 19         | 54               | 11              | 7    | 0        |            | 111 | 48              | 20       | 36  | 23  |          |
| 25      |          | 11        | 9   | 25         | 1    |      | 13 | 13         | 20  | 58         | 23       | 25   | 19         | 41               | 10              | 46   | 0        | 52         | 12  | 8               | 20       | 48  | 23  |          |
| 26      |          | <b>56</b> | 9   | 3          | 2    | 15   | 13 | 32         | 21  | 9          | 23       | 23   | 19         | 28               | 10              | 26   | 1        |            | 12  |                 | 20       | 59  | 23  |          |
| 27      |          | 41        | 8   | 40         | 2    |      | 13 | 52         | 21  | 19         | 23       | 21   | 19         | 14               | 10              | 5    | 1        | 39         | 12  | 49              | 21       | 10  | 23  |          |
| 28      |          | 26        | 8   | 18         | 3    | 2    | 14 | 11         | 21  | 29         | 23       | 18   | 19         | 1                | 9               | 43   | 2        | 2          | 13  | 10              | 21       | 21  |     | 18       |
| 29      |          | 10        | 7   | 5 <b>5</b> | 3    | 25   | 14 |            | 21  | 38         | 23       | 15   | 18         | 47               | 9               | 22   | 2        |            | 13  | 30              | 21       | 31  |     | 15       |
| 30      |          | 54        |     |            | 3    | 48   | 14 | <b>4</b> 8 | 21  | 47         | 23       |      | 18         | 32               | 9               | 1    | 2        |            | 13  |                 | 21       | 41. | 23  | 11       |
| 31      | 17       | 38        | 1   |            | 4    | 11   | 1  |            | 21  | 56         | <u> </u> |      | 18         | 18               | 8               | 39   | <u> </u> |            | 14  | 9               | 1        |     | 23  | 7        |

#### TABLE XXV.

| Periods            |                   |              |                   |     |     | N   | 10         | NΤ    | H S |          |            |   |       |       |     | D'1-               |
|--------------------|-------------------|--------------|-------------------|-----|-----|-----|------------|-------|-----|----------|------------|---|-------|-------|-----|--------------------|
| of                 |                   | A            | <b>LKIT</b>       |     | 1   |     | 1          | MA.Y. | ,   |          |            | J | UNE   | •     |     | Periods<br>of      |
| complete<br>Years. |                   |              | Days.             |     | Ī   |     | ]          | Days. |     |          |            |   | Days. |       |     | complete<br>Years. |
| :                  | 1                 | 7            | 13                | 19  | 25  | 1   | 7          | 13    | 19  | 25       | 1 .        | 7 | 13    | 19    | 25  | 1040               |
| 4                  | + 0.7             | #.           | +                 | +   | +   | +   | +          | +     | +   | +<br>0.3 | +          | + | +     | + 0.0 | +   |                    |
| . 8                | 1.4               | 1.4          | 1.3               | 1.3 | 1.2 | 1.1 | 0.5<br>1.0 |       |     |          | 0.5        | - |       |       |     | 8                  |
| 12<br>16           | $\frac{2.1}{2.8}$ | $2.1 \\ 2.7$ | $\frac{2.0}{2.6}$ |     |     |     | 1.6        | 1.4   |     | 1.0      | 0.8<br>1.0 |   |       | 0.1   | 0.2 |                    |
| 20                 | 3.5               |              |                   | 3.2 |     |     |            |       |     | 1.6      |            |   | i -   |       | 0.3 |                    |
| ,                  |                   | •            |                   |     | -   |     |            |       |     |          | -          | 1 |       |       |     |                    |

### DECLINATION OF THE SUN, FOR THE YEAR 1805,

(or 1809, 1813, 1817,)

#### BEING THE FIRST AFTER LEAP YEAR.

|               |                 | 1               | 1             |                |                               | MONT           | HS.            |                 |               |                               |                        |                 |
|---------------|-----------------|-----------------|---------------|----------------|-------------------------------|----------------|----------------|-----------------|---------------|-------------------------------|------------------------|-----------------|
|               | Jan.            | Feb.            | March         | April.         | May.                          | June.          | July.          | Aug.            | Sept.         | Oct.                          | Nov.                   | Dec.            |
| days          | South.          | South.          | S. & N.       | North.         | North.                        | North.         | North.         | North.          | N. & S.       | South.                        | South.                 | South.          |
| 1 2           | 23° 2'<br>22 57 | 17° 8′<br>16 51 | 7°38′<br>7 15 | 4°29′<br>4 52  | 15° 2′<br>15 20               |                | 23° 9′<br>23 5 | 18° 6′<br>17 51 | 8°29′<br>8 1  | 3° 7′<br>3 30                 | 14°24'<br>14 43        | 21°49'<br>21 57 |
| 3             | 22 51           | 16 33           | 6 52          | 5 15           | 15 37                         | 22 18          | 23 0           | 17 35           | 7 39          | 3 53                          | 15 .2.                 | 22 7            |
| <b>4</b><br>5 | 22 45<br>22 38  | 16 15<br>15 57  | 6 29<br>6 6   | 5 38<br>6 1    | 15 55<br>16 12                |                | 22 55<br>22 50 | 17 20<br>17 4   | 7 17<br>6 54  | 4 17<br>4 40                  | 15 21<br>15 39         | 22 15<br>22 23  |
| 6             | 22 31<br>22 24  | 15 39<br>15 20  | 5 43<br>5 19  | 6 24<br>6 46   | 16 29<br>16 46                | 22 39<br>22 45 | 22 44<br>22 38 | 16 47<br>16 31  | 6 32          | 5 S<br>5 26                   | 15 57<br>16 15         | 22 30<br>22 37  |
| 8             | 22 16<br>22 8   | 15 I<br>14 42   | 4 56<br>4 33  | 7 9 7 31       | 17 3<br>17 19                 | 22 51<br>22 56 | 22 32<br>22 25 | 16 14<br>15 57  | 5 47<br>5 25  | 5 45<br>6 12                  | 16 33<br>16 <b>5</b> 0 | 22 44<br>22 50  |
| 10            | 21 59           | 14 23           | 4 9           | 7 53           | 17 35                         |                | 22 18          | 15 39           | 5 2           | 6 35                          | 17 7                   | 22 56           |
| 11<br>12      | 21 50<br>21 40  | 14 S<br>13 44   | 3 46<br>3 22  | 8 16<br>8 37   | 17 <i>5</i> 0<br>18 6         |                | 22 10<br>22 2  | 15 22<br>15 4   | 4 39 4 .16    | 6 57<br>7 20                  | 17 24<br>17 41         | 23 1<br>23 6    |
| 13            | 21 30           | 13 24           | 2 58          | 8 59           | 18 21                         | 23 13          | 21 53          | 14 46           | 3 53          | 7 48                          | 17 57                  | 23 10           |
| 14<br>15      | 21 20<br>21 9   | 13 S<br>12 43   | 2 35<br>2 11  | 9 21<br>9 43   | 18 <i>35</i><br>18 <i>5</i> 0 | 28 16<br>28 19 | 21 45<br>21 35 | 14 27<br>14 9   | 3 30          | 8 5<br>8 27                   | 18 13<br>18 <b>2</b> 8 | 23 14<br>23 17  |
| 16            | 20 58<br>20 46  | 12 22<br>12 1   | 1 48          | 10 4<br>10 25  | 19 4<br>19 17                 |                | 21 26<br>21 16 | 13 50<br>13 31  | 2 44 2 21     | 8 50<br>9 12                  | 18 43<br>18 58         | 23 20<br>23 23  |
| 18<br>19      | 20 34<br>20 22  | 11 40<br>11 19  | 1 0<br>0 36   | 10 46<br>11 7  | 19 31<br>19 44                |                | 21 6<br>20 55  | 13 12<br>12 52  | 1 57          | 9 34<br>9 56                  | 19 13<br>19 27         | 23 25<br>23 26  |
| 20            | 20 9            | 10 57           | 0 13          | 11 28          | 19 57                         | 23 27          |                | 12 33           | 1 11          | 10 17                         | 19 41                  | 23 27           |
| 21<br>22      | 19 56<br>19 42  | 10 36<br>10 14  | 0 11N<br>0 35 | 11 48<br>12 8  | 20 9<br>20 21                 | 23 28<br>23 28 | 20 33<br>20 21 | 12 13<br>11 53  | 0 47<br>0 24  | 10 39<br>11 0                 | 19 55<br>20 8          | 23 28<br>23 28  |
| 23            | 19 28           | 9 52            | 0 58          | 12 28          | 20 33                         | 23 27          | 20 9           | F1 52           | o i           | 11 21                         | 20 <b>20</b>           | 23 27           |
| 24<br>25      | 19 14<br>19 0   | 9 30            | 1 22<br>1 45  | 12 48<br>13 8  | 20 44<br>20 55                | 23 27<br>23 25 | 19 57<br>19 44 | 11 12<br>10 51  | 0 23S<br>0 46 |                               | 20 33<br>20 45         | 23 27<br>23 25  |
| 26<br>27      | 18 45<br>18 29  | 8 46<br>8 23    | 2 9<br>2 32   | 13 28<br>13 47 | 21 6<br>21 16                 | 23 24<br>23 21 | 19 31<br>19 18 | 10 31<br>10 10  | 1 10          | 12 <b>24</b><br>12 <b>4</b> 5 | 20 56<br>21 8          | 23 23<br>23 21  |
| 28<br>29      | 18 14<br>17 58  | 8 0             | 2 56<br>3 19  | 14 6<br>14 25  | 21 26<br>21 36                | 23 19<br>23 16 | 19 4<br>18 50  | 9 49<br>9 27    | 1 57          | 18 5<br>13 25                 | 21 19<br>21 29         | 23 18<br>23 15  |
| 30            | 17 41           |                 | 3 43          | 14 49          | 21 45                         | 23 13          | 18 36          | 9 6             | 2 43          | 13 45                         | 21 39                  | 23 12           |
| 31            | 17 25           | ·               | 4 6           | ·              | 21 54                         | 1              | 118 21         | 8 44            | ·             | 114 4                         | I                      | 23 8            |

#### TABLE XXV.

| Periods            |      |      |       |     |     | 1    | o N  | N T   | Н \$ | ١.   |     |     |       |      |     | Periods           |
|--------------------|------|------|-------|-----|-----|------|------|-------|------|------|-----|-----|-------|------|-----|-------------------|
| of                 |      | J    | ULY   | •   |     |      | ΑŢ   | JGUS  | ST.  |      |     | SEP | ГEМ   | BER. |     | of                |
| complete<br>Years. |      |      | Days. |     |     |      |      | Days. |      |      |     |     | Days. |      |     | complete<br>Years |
| Tears.             | 1    | 7    | 13    | 19  | 25  | 1    | 7    | 13    | 19   | 25   | 1   | 7   | 13    | 19   | 25  |                   |
|                    | _    | _    | -     | _   |     | 1    |      |       | _    | _    | _   | _   | -     | _    | +   |                   |
| 4                  | 0'.1 | 0'.2 | 0'.3  |     |     | 0'.5 | 0'.5 |       |      | 0'.7 | 0.7 | 0.7 | 0'.7  | 0.7  | 0.7 | 4                 |
| 8                  | 0.8  | 0.4  |       |     | 0.9 | 1.0  | 1.1  | 1.2   |      |      |     |     |       |      |     | 8                 |
| 12                 | 0.4  | 0.7  | 1     | 1.1 | 1.3 |      |      |       |      |      |     |     |       |      |     | . 12              |
| 16                 | 0.6  | 0.9  | 1.2   | 1.4 | 1.7 |      |      |       |      |      |     |     |       |      | 2.9 |                   |
| 20                 | 0.7  | 1.1  | 1.5   | 1.8 | 2 2 | 2.5  | 2.7  | 3.0   | 8.2  | 3.3  | 3.4 | 3.5 | 3.5   | 8.6  | 3.6 | 20                |

### DECLINATION OF THE SUN, FOR THE YEAR 1806,

(or 1810, 1814, 1818,)

### BEING THE SECOND AFTER LEAP YEAR.

|      | · · ·  |         |         | ·            |               |        |               |         |         |        |         |                     |
|------|--------|---------|---------|--------------|---------------|--------|---------------|---------|---------|--------|---------|---------------------|
|      |        |         |         |              |               | MON    | THS.          | 1       |         |        |         |                     |
|      | Jan.   | Feb.    | March   | April.       | May.          | June   | July.         | Aug.    | Sept.   | Oct    | Nov.    | Dec.                |
| days | South. | South.  | S. & N. | North        | Nort h.       | North. | North.        | North.  | N. & S. | South. | South.  | South.              |
| . 1  | 290 31 | 17012   | 70431   | 40231        | 14057/        | 22° 0′ | 23° 10′       | 18° 10′ | 80 281  | 3º 1'  | 14º 19' | 21046               |
| 2    | 22 58  | 16 55   | 7 21    | 4 47         |               | 22 8   | 23 6          | 17 55   | 8 6     | 3 24   | 14 38   | 21 55               |
| 8    | 22,53  | 16 38   | 6 58    | 5 10         | 15 33         | 22 16  | 23 2          | 17 39   | 7 44    | 3 48   | 14 57   | 22 4                |
| 4    | 22 47  | 16 20   | 6 95    | 5 53         | 15 5l         | 22 24  | 22 57         | 17 24   | 7 22    | 4 11   |         | 22 13               |
| 5、   | 22 40  | 16 2    | 6 12    | <b>5 5</b> 5 | 16 8          | 22 31  | 22 52         | 17 8    | 7 0     | 4 34   |         | 22 21               |
| 6    | 22 33  | 15 44   | 5 48    | 6 18         | 16 25         | 22 37  | 22 46         | 16 52   | 6 38    | 4 57   |         | 22 28               |
| 7    | 22 26  | 15 25   | 5 25    | 6 41         | 16 42         | 22 43  | 22 40         | 16 35   | 6 15    | 5 20   |         | 22 35               |
| 8    |        | 15 6    | 5 2     | 7 3          | 16 59         | 22 49  | 22 34         | 16 18   | 5 53    | 5 48-  |         | 22 42               |
| 9    | 22 10  | 14 47   | 4 38    | 7 26         | 17 15         | 22 55  | 22 27         | 16 1    | 5 30    | 6 6    | ,       | 22 48               |
| 10   | 22 1   | 14 28   | 4 15    | 7 48         | 17 31         | 23 0   | 22 20         | 15 44   | 5 7     | 6 29   | 17 3    | 22 54               |
| 11   | 21 52  | 14 8    | 3 51    | 8 10         | 17 47         | 23 4   | 22 12         | 15 26   | 4 45    | 6 52   | 17 20   | 25 0                |
| 12   | 21 43  | 13 49   | 3 28    | 8 32         | 18 2          | 23 8   | 22 4          | 15 9    | 4 22    | 7 15   | 17 37   | <b>2</b> 3 <b>5</b> |
| 15   |        | 13 90   | 3 4     | 8 54         | 18 17         | 23 12  | 21 56         | 14 51   | 3 59    | 7 37   | 17 53   | 23 9                |
| 14   |        | 13 8    | 2 41    | 9 16         |               | 23 16  | 21 47         | 14 32   | 3 36    | 8 0    | 18 9    | 23 13               |
| 15   |        | 12 48   | 2 17    |              |               | 23 19  | 21. 38        | 14 14   | 3 13    | 8 22   | 18 25   | 23 17               |
| 16   |        | 12 27   | 1 53    | 9 59         | 19 0          | 23 21  | 21 28         | 13 55   | 2 50    | 8 44   |         | 23 20               |
| 17   |        | 12 6    |         | 10 20        | 19 14         | 23 23  | 21 18         | 13 36   | 2 26    | 9 7    | 18 55   | 23 22               |
| 18   |        | 11 45   |         | 10 41        | 19 28         | 23 25  | 21 8          | 13 17   | 2 3     | 9 29   | 19 9    | 23 24               |
| 19   |        | 11 24   |         | 11 2         | 19 41         | 23 26  | 20 58         | 12 57   | 1 40    | 9 50   | 19 24   | 23 26               |
| 20   | 20 12  | 11 3    | 0 19    | 11 23        | 19 54         | 23 27  | 20 47         | 12 38   | 1 16    | 10 12  | 19 38   | 23 27               |
| 21   | 19 59  | 10 41   | 0. 5N   | 11 43        | 20 6          | 23 28  | 20 36         | 12 18   | 1 53    | 10 34  | 19 52   | 23 28               |
| 22   | 19 46  | 10 20   |         |              | 20 18         | 23 28  | 20 24         | 11 58   | 0 30    | 10 55  | 20 5    | 23 28               |
| 23   | 19 32  | . 9 .58 |         | 12 24        | 20 30         | 23 28  | 20 12         | 11 38   | 0 6     | 11 16  | 20 18   | 23 28               |
| 24   | 19 18  | 9 36    |         |              | 20 42         | 23 27  | 20 0          | 11 17   | 0 178   | 11 37  | 20 30   | 23 27               |
| 25   | 19 3   | 9 13    |         | 13 3         | 20 <b>5</b> 3 | 23 26  | 19 47         | 10 57   | 0 41    | 11 58  | 20 42   | 23 26               |
| 26   | 18 48  | 8 51    | 2 3     | 13 23        | 21 4          | 23 24  | 19 34         | 10 36   | 1 4     |        | 20 54   | 23 24               |
| 27   | 18 33  | ß 29    |         |              | 21 14         | 23 22  | 19 21         | 10 15   | 1 28    | 12 40  | 21 5    | 23 22               |
| 28   | 18 18  | 8 6     | 2 50    | 14 1         | 21 24         | 23 20  | 19 7          | 9 54    | 1 5 i   | 13 0   | 21 16   | 23 19               |
| 29   | 18 2   |         |         | 14 20        | 21 34         | 23 17  | 18 <i>5</i> 3 | 9 33    | 2 14    | 13 20  | 21 27   | 23 16               |
| 30   | 17 46  | .       |         |              |               | 23 14  | 18 39         | 9 11    | 2.38    | 13 40  | 21 37   | 23 13               |
| 31   | 17 29  |         | 4 0     |              | 21 52         |        | 18 25         | 8 50    | I       | 14 0   | ı       | 23 9                |
| -    |        |         |         |              |               |        |               |         |         |        |         |                     |

#### TABLE XXV.

| Periods            |            |    |                   |      |     | N                 | иο                | NT    | ΉS     | 3.  |        |        |       |      |     | <b>D</b>        |    |
|--------------------|------------|----|-------------------|------|-----|-------------------|-------------------|-------|--------|-----|--------|--------|-------|------|-----|-----------------|----|
| of                 |            | oc | тов               | ER.  |     |                   | NOV               | /EM   | BER.   |     |        | DEC    | EME   | BER. |     | Period<br>of    | 5  |
| complete<br>Years. | -          |    | Days.             |      |     | ·                 |                   | Days. |        |     |        |        | Days. |      |     | comple<br>Years | te |
| 10                 | 1          | 7  | 13                | 19   | 25  | 1                 | 7                 | 13    | 19     | 25  | 1      | 7      | 13    | 19   | 25  | 1 cars          |    |
| - 4                | +          | +  | + 0.7             | +    | +   | +                 | + 0'.5            | +     | + 0'.4 | +,  | + 0'.2 | + 0/.2 | +     | +    | =   |                 | _  |
| 4<br>8             | 1.4        |    | 1.3               | 0'.6 | 046 | 1.1               | 1.0               |       |        | 0.7 |        |        |       | 0.0  |     | 4<br>8          |    |
| 12<br>16           | 2.1<br>2.8 |    | $\frac{2.0}{2.6}$ |      |     | $\frac{1.6}{2.2}$ | $\frac{1.5}{2.0}$ |       |        | 1.0 |        | 0.5    |       |      | 0.1 | 12<br>16        |    |
| 20                 | 3.5        |    |                   |      |     |                   |                   |       |        | 1.7 |        |        |       |      |     |                 |    |

### TABLE XXVI.

TO REDUCE THE SUN'S DECLINATION TO ANY GIVEN MERIDIAN, AND TO ANY GIVEN TIME UNDER THAT MERIDIAN.

| in E.   | in E.  |                                 |  |  |  |  |  |  | LO   | N (   | 317                                    | r U   | DE                                     |   |  |  |  |  |  | in W   |
|---|--|---------------------------------|--|--|--|--|--|--|--|---|--|---|--|---|--|--|--|--|--|--|
|   | Add. i   | 10                              | 20                                     | 30                                     | 40   | 50                                     | 60                                     | 70                                     | 80   | 90  | 100                                    | 110   | 120                                    | 130   | 140  | 150                                    | 160  | 170  | 180  | Add in<br>Sub, in                            |
| 20<br>19<br>18<br>17<br>16<br>15<br>14<br>13                      | 22 (<br>23 (<br>24 (<br>25 (<br>26 (<br>27 )<br>28 ( | 0.0                             | 0.0<br>0.1<br>0.1<br>0.1<br>0.1        | 0.1 $0.2$ $0.2$ $0.2$ $0.2$            | 0.0<br>0.1<br>0.1<br>0.2<br>0.2<br>0.3<br>0.3        | 0.2<br>0.2<br>0.3<br>0.4<br>0.4        | 0.1<br>0.2<br>0.3<br>0.4<br>0.4        | 0.2<br>0.3<br>0.4<br>0.5<br>0.6        | 0.3<br>0.4<br>0.5<br>0.6<br>0.7                                | 0.2<br>0.3<br>0.4<br>0.5<br>0.7<br>0.8          | 0.5<br>0.4<br>0.5<br>0.6<br>0.8<br>0.9 | 0.4<br>0.5<br>0.7<br>0.8<br>0.9               | 0.3<br>0.4<br>0.6<br>0.7<br>0.9        | 0.5<br>0.6<br>0.8<br>0.9                      | 0.3<br>0.5<br>0.7<br>0.8<br>1.0                                    | 0.5<br>0.7<br>0.9<br>1.1<br>1.3        | 0.2<br>0.4<br>0.6<br>0.8<br>1.0<br>1.2<br>1.4<br>1.6 | 0.2<br>0.4<br>0.6<br>0.8<br>1.0<br>1.5<br>1.4<br>1.7 | 0.2<br>0.4<br>0.6<br>0.9<br>1.1<br>1.3<br>1.5            | 20<br>19<br>18<br>17<br>16<br>15<br>14<br>13 |
| December.<br>110 9 8 7 6 5 4                                      | 1<br>2<br>3<br>4<br>5<br>6                           | 0.1<br>0.1<br>0.2<br>0.2<br>0.2 | 0.3<br>0.3<br>0.3<br>0.3<br>0.4<br>0.4 | 0.4<br>0.4<br>0.5<br>0.5<br>0.5<br>0.6 | 0.5<br>0.6<br>0.6<br>0.7<br>0.7<br>0.8<br>0.8        | 0.7<br>0.7<br>0.8<br>0.8<br>0.9        | 0.8<br>0.9<br>0.9<br>1.0<br>1.1<br>1.2 | 0.9<br>1.0<br>1.1<br>1.2<br>1.3<br>1.4 | 1.1<br>1.2<br>1.3<br>1.4<br>1.4<br>1.5                         | 1.2<br>1.3<br>1.4<br>1.5<br>1.6<br>1.7          | 1.3<br>1.5<br>1.6<br>1.7<br>1.8<br>1.9 | 1.5<br>1.6<br>1.7<br>1.9<br>2.0<br>2.1<br>2.3 | 1.8<br>1.9<br>2.0<br>2.2<br>2.3<br>2.5 | 1.7<br>1.9<br>2.1<br>2.2<br>2.4<br>2.5<br>2.7 | 1.9<br>2.0<br>2.2<br>2.4<br>2.5<br>2.7                             | 2.2<br>2.4<br>2.6<br>2.7<br>2.9        | 1.9<br>2.1<br>2.3<br>2.5<br>2.7<br>2.9<br>3.1<br>3.3 | 2.1<br>2.5<br>2.5<br>2.7<br>2.9<br>3.1<br>3.3<br>3.5 | 2.2<br>2.4<br>2.6<br>2.8<br>3.1<br>3.3<br>3.5<br>5.7     | 11<br>10<br>9<br>8<br>7<br>6<br>5<br>4       |
| 25<br>23<br>21<br>19  | 10<br>12<br>14<br>16<br>18<br>20                     | 0.2<br>0.3<br>0.3<br>0.3<br>0.3 | 0.5<br>0.6<br>0.6<br>0.6<br>0.6        | 0.7<br>0.8<br>0.8<br>1.9<br>1.0        | 0.9<br>0.9<br>1.0<br>1.1<br>1.2<br>1.3<br>1.4        | 1.2<br>1.3<br>1.4<br>1.5<br>1.6        | 1.4<br>1.6<br>1.7<br>1.8<br>1.9<br>2.1 | 1.7<br>1.8<br>2.0<br>2.1<br>2.9<br>2.4 | 2.4  | 2.1<br>2.3<br>2.5<br>2.7<br>2.5<br>3.1          | 2.4<br>2.6<br>2.8<br>3.0<br>3.2<br>3.4 | 2.6<br>2.9<br>3.1<br>3.3<br>3.6<br>3.8        | 2.9<br>3.1<br>3.4<br>3.6<br>3.9<br>4.1 | 3.1<br>3.4<br>3.7<br>3.9<br>4.2<br>4.5        | 4.5  | 4.6 $4.9$ $5.2$                        | 3.5<br>3.8<br>4.2<br>4.5<br>4.9<br>5.2<br>5.5<br>5.8 | 3.7<br>4.1<br>4.4<br>4.8<br>5.2<br>5.5<br>5.9<br>6.2 | 3.9<br>4.3<br>4.7<br>5.1<br>5.5<br>5.8<br>6.2<br>6.6     | 3<br>1<br>30<br>28<br>26<br>24<br>22<br>20   |
| 17<br>15<br>18<br>19<br>7<br>5<br>8                               | 26<br>28<br>30<br>1<br>3<br>5                        | 0.4<br>0.4<br>0.4<br>0.5<br>0.5 | 0.8<br>0.9<br>0.9<br>0.9               | 1.2<br>1.3<br>1.3<br>1.4<br>1.4        | 1.5<br>1.6<br>1.7<br>1.7<br>1.8<br>1.9<br>1.9<br>2.0 | 2.0<br>2.1<br>2.2<br>2.3<br>2.3<br>2.4 | 2.4<br>2.5<br>2.6<br>2.7<br>2.8<br>2.9 | 2.8<br>2.9<br>3.1<br>3.5<br>3.6        | 3 3 . 2<br>9 3 . 4<br>1 3 . 5<br>2 3 . 6<br>3 3 . 8<br>4 3 . 9 | 3.6<br>3.8<br>3.9<br>3.9<br>3.9<br>4.1<br>3.4.9 | 4.0<br>4.2<br>4.4<br>4.5<br>4.7<br>4.8 | 4.4<br>4.6<br>4.8<br>5.0<br>5.5<br>5.5        | 5.0<br>5.4<br>5.6<br>5.8               | 5.2<br>5.5<br>5.7<br>5.9<br>6.1<br>6.3        | 5.6<br>5.9<br>6.1<br>6.4<br>6.6<br>6.8                             | 6.0<br>6.3<br>6.6<br>6.8<br>7.0<br>7.3 | 6.1<br>6.4<br>6.7<br>7.0<br>7.5<br>7.5<br>7.7<br>8.0 | 6.5<br>6.8<br>7.1<br>7.4<br>7.7<br>8.0<br>8.2<br>8.5 | 6.9<br>7.2<br>7.6<br>7.9<br>8.2<br>8.5<br>8.7<br>9.0     | 18 May 14 12 10 8 6 4                        |
| October.<br>28 28 36 26 15 18 18 18 18 18 18 18 18 18 18 18 18 18 | 20 23  | 0.5<br>0.6<br>0.6<br>0.6        | 1.1                                    | 1.7                                    | 2.0<br>2.1<br>2.1<br>2.2<br>2.2<br>2.3<br>2.4<br>2.4 | 2.6<br>2.7<br>2.7<br>2.8<br>2.9<br>3.0 | 3.1<br>3.9<br>3.4<br>3.4<br>3.5<br>3.5 | 3.8<br>3.8<br>3.8<br>4.0<br>4.0        | 8 4.5<br>8 4.4<br>9 4.5<br>0 4.6<br>1 4.7                      | 2 4.3<br>3 4.8<br>4 4.9<br>5 5.0<br>6 5.9       | 35.4<br>95.3<br>95.6<br>25.8           | 5.8<br>5.9<br>6.0<br>6.9<br>6.9<br>6.9        | 6.5                                    | 6.8<br>7.6<br>7.9<br>7.9                      | 7.5<br>7.7<br>7.9<br>8.1<br>8.8                                    | 7.9<br>8.1<br>8.2<br>8.4<br>8.7<br>8.9 | 8.2<br>8.4<br>8.6<br>8.8<br>9.0<br>9.2<br>9.5<br>9.7 | 9.8  | 9.2<br>9.5<br>9.7<br>9.9<br>10.1<br>10.4<br>10.6<br>10.9 | 30<br>28<br>28<br>26<br>24<br>21<br>18<br>15 |
| 25 Sept. 30 Narch. March.   | 7<br>10<br>13<br>16                                  | 0.6<br>0.6<br>0.6<br>0.7        | 1.9<br>1.3<br>1.3<br>1.3<br>1.3        | 1.9                                    | 2.5<br>2.5<br>2.6<br>2.6<br>2.6                      | 3.2<br>3.2<br>3.2<br>3.2<br>3.2<br>3.2 | 3.8                                    | 7 4<br>8 4<br>9 4<br>9 4               | 4 5.0<br>4 5.<br>5 5.  | 1 5.<br>1 5.<br>2 5.<br>2 5.<br>2 5.            | 6 6                                    | 3 7.0<br>4 7.0<br>5 7.<br>5 7.                | 9 7<br>0 7<br>1 7<br>1 7<br>2 7        | 5 8 . 1<br>5 8 . 1<br>7 8 . 1<br>7 8 . 1      | 8.8<br>8.9<br>8.9<br>8.9<br>8.9<br>8.9<br>8.9<br>8.9<br>8.9<br>8.9 | 9.4                                    | 10.1<br>10.9<br>10.9<br>10.4                         | 10.6<br>10.8<br>10.9<br>11.0<br>11.0                 | 11.3<br>11.4<br>11.5<br>11.6<br>11.7                     | Mar<br>25                                    |
| Sub. bef. N.  | Add. bef. N.   | h<br>02/3                       | h<br>11/3                              | h<br>2.0                               | h<br>2 <sup>2</sup> / <sub>3</sub>                   | h<br>31/3                              | h<br>4.0                               |  |  | 6.  | 0 6                                    | 7-  | 8.                                     | 0 8   | h<br>9   | le.                                    | h<br>10 <sup>2</sup> 3                               | h<br>11 1/3  | h<br>12.0  | Add aft. N.                                  |

RIGHT ASCENSIONS AND DECLINATIONS OF THE PRINCIPAL FIXED STARS, ADAPTED TO THE BEGINNING OF THE YEAR 1805.

|                                     |       | Rio | ht A     | scen-      | , ,          |                           | <del></del>        |
|-------------------------------------|-------|-----|----------|------------|--------------|---------------------------|--------------------|
| Names of Stars.                     | Mag.  |     |          | ime.       | Ann.Vat.     | Declination.              | Ann. Var.          |
| y PegasiAlgenib                     | 2     | Oh  | 3/       | 12"        | 3./06        | 14° 5′ 55″ N.             | + 20.00            |
| a CassiopeiæSchedar                 | 3     | 0   | 29       | 30         | 3.31         | 55 27 58 N.               | +19.9              |
| a Ursæ Minoris. Alruccabab, p. Star |       | O   | 53       | 25         | 12.89        | 88 16 3 N.                | + 19.6             |
| β AndromedæMiracb                   | 2     | 0   | 58       | <i>5</i> 0 | 3.30         | 34 35 10 N.               | +19.4              |
| a Eridani Achernar                  | 1     | 1   | 30       | 26         | 2.25         | 58 18 10 S.               | <b>—</b> 18.5      |
| y Andromedæ Almacb                  | 2     | 1   | 51       | 59         | 3.61         | 41 23 17 N.               | + 17.7             |
| Arietis #                           | 2.5   | 1   | 56       | 12         | 3.33         | 22 32 8 N.                | 17.5               |
| a CetiMenkar                        | 2     | 2   | 52       | 6          | 3.12         | 3 20 11 N.                | + 14.6             |
| B Persei Algol                      | Vari. | 2   | 55       | 31         | 3.85         | 40 11 44 N.               | + 14.4             |
| n PleiadumAlcyone                   | 3′    | 3   | 35       | 35         | 3.54         | 23 29 36 N.               | + 11.7             |
| a Tauri * Aldebaran                 | 1     | 4   | 24       | 44         | 3.42         | 16 6 24 N.                | + 8.1              |
| a Aurigæ Capella                    | 1.    | 5   | 2        | 18         | 4.41         | 45 47 16 N.               | 5.0                |
| β Orionis Rigel                     | 1 1   | 5   | 5        | 9          | 2.87         | 8 26 10 S.                | 4.8                |
| β Tauri                             | 2     | 5   | 13       | 58         | 3.78         | 28 25 50 N.               | + 4.0              |
| y Orionis Bellatrix                 | 2     | 5   | 14       | 41         | 3.21         | 6 9 43 N.                 | + 4.0              |
| d Orionis                           | 2     | 5   | 22       | 3          | 3,06         | 0 28 9 S.                 | - 3.3              |
| Orionis                             | 2     | . 5 | 26       | 19         | 3.04         | 1 20 7 S.                 | - 3.0              |
| ζ Orionis                           | 2     | 5   | 30       | 56         | 3.02         | 2 3 19 S.                 | - 2.6              |
| a Columba                           | 2     | 5   | 32       | 36         | 2.17         | 34 11 3 S.                | - 2.4              |
| a Orionis Betelguese                | 1     | 5   | 44       | . 37       | 3.24         | 7 21 34 N.                | + 1.4              |
| a Navis Canopus                     | 1     | 6   | 19       | 38         | 1.33         | 52 35 36 S.               | + 1.7              |
| a Canis MajorisSirius               | 1     | 6   | 36       | 33         | 2.65         | 16 27 26 S.               | 4.3                |
| a GeminorumCastor                   | 1.2   | 7   | 22       | 8          | 3.85         | 32 18 15 N.               | 6.9                |
| a Canis Minoris Procyon             | 1.2   | 7   | 29       | 6          | 3.14         | 5 43 34 N.                | <b>—</b> 7.5       |
| β Geminorum * Pollux                | 2.3   | 7   | 33       | 21         | 3.69         | 28 29 O N.                | <b>—</b> 7.9       |
| y Navis                             | .2    | 8   | 18       | 31         | 1.25         | 58 53 15 S.               | + 11.4             |
| a 2 Canori Acubens                  | 4.3   | 8   | 47       | 48         | 3.29         | 12 36 26 N.               | - 13.2             |
| a HydraAlphard                      | 2     | 9   | 18       | 0          | 2.93         | 7 49 10 S.                | + 15.2             |
| a Leonis # Regulus                  | 1 2   | 9   | 57       | <i>5</i> 8 | 3.20         | 12 54 55 N.               | <b>—</b> 17.2      |
| β Ursæ Majoris                      |       | 10  | 49       | 59         | 3.71         | 57 25 36 N.               | <u>— 19.1</u>      |
| a Ursæ Majoris Dubbe                | 2.1   | 10  | 51       | 3 <b>5</b> | 3.85         | 62 48 21 N.               | <b>— 19.2</b>      |
| B Leonis Deneb                      | 2.1   | 11  | 39       | 5          | 3.06         | 15 39 49 N.               | - 19.9             |
| γ CorviAlgorab                      | 3     | 12  | 5        | 47         | 3.08         | 16 27 30 S.               | + 20.0             |
| « Crucis                            | 1     | 12  | 15       | 53         | 3.24         | 62 1 6 S.                 | + 20.0             |
| y Crucis                            | 2     | 12  | 20       | 26         | 3.24         | 56 1 2 S.                 | +20.0 $-19.7$      |
| Ursæ Majoris. Aliath                | 2     | 12  | 45       | 24         | 2.40         | 57 1 17 N.                | — 19.7<br>— 19.5   |
| a Virginis * Spica Virginis         | 3     | 13  | 52<br>14 | 28<br>56   | 3.00<br>3.13 | 12 0 41 N.<br>10 8 15 S.  | + 18.9             |
| n Ursæ Majoris. Benetnach           | 2     | 13  | 39       | <i>5</i> 1 | 2.39         | 50 17 32 N.               | $\frac{1}{2}$ 18.1 |
| a Bootis Arcturus                   | ī     | 14  | 6        | 46         | 2.72         | 20 12 10 N.               | - 19.1             |
| <del></del>                         |       |     |          |            |              |                           |                    |
| y Bootis Seginus                    | 3     | 14  | 24       | 13         | 2.43         | 39 10 1 N.                | - 16.2             |
| a Centauri                          | 1     | 14  | 26       | 54         | 4.45         | 60 1 57 S.                | + 16.1             |
| a 2 Libra Zubeneseb                 | 2.3   | 14  | 40       | 6          | 3.29         | 15 13 16 S.               | + 15.3             |
| & Coronæ Borealis. Alphacea         | 2     | 15  | 26       | 26         | 2.53         | 27 22 53 N.               | -12.4              |
| a Scorpii * Antares                 | 2     | 15  | 54<br>17 | 7<br>28    | 3.47         | 19 15 34 S.<br>25 59 5 S. | + 10.5 $+ 8.7$     |
| a Herculis Ras Algethi              | 2.3   | 17  | 5        | 28<br>46   | 2.73         | 14 37 22 N.               | T 4.7              |
| A Scorpii Lesath                    | 3.2   | 17  | 20       | 23         | 4.06         | 36 36 45 S.               | + 3.5              |
| a Ophiuchi Ras Alkague              | 2     | 17  | 26       | 43         | 2.77         | 12 42 52 N.               | 3.0                |
| y DraconisRastaben                  | 3     | 17  | 52       | 5          | 1.39         | 51 31 2 N.                | - 0.7              |
| a LyrzVega                          |       |     |          |            |              | 38 36 27 N.               | + 2.6              |
| β CygniAlbirce                      | 1     | 18  | 90       | 20<br>51   | 2.08<br>2.42 | 27 33 30 N.               | I 7.1              |
| a Aquilæ * Altair                   | 1.2   | 19  | 22<br>41 | 16         | 2.92         | 8 21 39 N.                | ¥ 8.5              |
| a Pavonis                           | 1.2   | 20  | 10       | 8          | 4.84         | 57 22 28 S                | <del>-</del> 10.7  |
| a CygniDeneb                        | 1.2   | 20  | 34       | 47         | 2.03         | 44 95 22 N.               | + 12.5             |
| a Cephei Alderaimin                 | ร     | 21  | 13       | 54         | 1.43         | 61 45 46 N.               | + 12.5<br>+ 15.0   |
| a Gruis                             | 2     | 21  | 55       | 52         | 3.85         | 44 53 43 S.               | <b>—</b> 17.1      |
| a Pisc. Australis * Fomalbaut       | 1     | 22  | 46       | 51         | 3.33         | 30 39 7 S.                | <b>19</b> .0       |
| B Pegasi Scheat                     | 2     | 22  | 54       | 19         | 2.87         | 27 1 33 N.                | + 19.2             |
| a Pegasi * Markah                   | 2     | 22  | 55       | 3          | 2.96         | 14 9 34 N.                | + 19.2<br>+ 20.0   |
| a AndromedaAlpheratz                | 2     | 23  | 58       | 19         |              | 28 0 53 N.                | + 20.0             |
|                                     |       |     |          |            |              |                           |                    |

| 3                    |                |                | ABLE X         |              |           |              |              |              | THE S          |                |                | 155            |
|----------------------|----------------|----------------|----------------|--------------|-----------|--------------|--------------|--------------|----------------|----------------|----------------|----------------|
| days                 | Jan.           | Feb.           | -              | April.       | May.      |              | July.        | Aug.         | ·              | Oct.           | Nov.           | Dec.           |
| 1                    | 18h43/         | 20h 56         |                | 0h 43'       | 2h 34     | 4º36'        | 6h41'        | ,            | ,              |                | 14h 26'        | 16h30          |
| 2                    | 18 48          |                | 22 53          | 0 46         | 2 38      | 4 41         | 6 45         | 8 49         | 10 45          | 12 33          | 14 30          | 16 34          |
| 3 4                  | 18 52<br>18 57 | 21 4<br>21 8   | 1              | 0 50         | 2 41 2 45 | 4 45         | 6 49         | 8 53         | 10 49          | 12 37          |                | 16 39          |
| 5                    | 19 1           | 21 12          |                | 0 57         | 2 49      | 4 53         | 6 57         | 8 57         | 10 52          | 12 41<br>12 44 |                | 16 49<br>16 47 |
| 6                    | 19 5           | 21 16          |                | l i i        | 2 53      | 4 57         | 7 1          | 9 5          | 11 0           |                |                | 16 52          |
| 7                    | 19 1Q          | 21 20          |                | 1 4          | 2 57      | 5 1          | 7 5          | 9 9          | 11 3           | 12 52          | 14 50          | 16 56          |
| 8                    | 19 14          | 21 24          | 23 15          | 1 8          | 3 1       | 5 5          | 7 10         | 9 12         | 11 7           | 12 55          | 14 54          | 17 0           |
| 9                    | 19 19          | 21 28          |                | 1 12         | 3 5       | 5 9          | 7 14         | 9 16         | 11 10          | 12 59          | 14 58          | 17 5           |
| 10                   | 19 23          | 21 32          | 23 22          | 1 15         | 3 8       | 5 13         | 7 18         | 9 20         | 11 14          | 13 3           | 15 2           | 17 9           |
| 11                   | 19 27          | 21 36          | 23 26          | 1 19         | 3 12      | 5 18         | 7 22         | 9 24         | 11 18          | 13 6           | 15 6           | 17 14          |
| 12                   | 19 32          | 21 40          | 23 30          | 1 23         | 3 16      | 5 22         | 7 26         | 9 28         | 11 21          | 13 10          | 15 10          | 17 18          |
| 13                   | 19 36          | 21 44          | 23 33          | 1 26         | 3 20      | 5 26         | 7 30         | 9 31         | 11 25          |                |                | 17 22          |
| 14                   | 19 40          | 21 48          | 23 37          | 1 30         | 3 24      | 5 30         | 7 34         | 9 35         | 11 28          | 13 17          |                | 17 27          |
| 15                   | 19 <b>4</b> 5  | 21 52<br>21 56 | 23 41<br>23 44 | 1 34         | 3 28      | 5 34<br>5 38 | 7 38         | 9 39 9 43    | 11 32          | 13 21<br>13 25 |                | 17 31          |
| 17                   | 19 49          | 22 0           | 25 44<br>23 48 | 1 37         | 3 32      | 5 43         | 7 46         | 9 46         | 11 39          | 13 25          |                | 17 36<br>17 40 |
| 18                   | 19 57          | 22 3           | 28 52          | 1 45         | 3 40      | 5 47         | 7 50         | 9 50         | 11 43          | 13 32          |                | 17 40<br>17 45 |
| 19                   | 20 2           | 22 7           | 23 55          | 1 49         | 3 44      | 5 51         | 7 54         | 9 54         | 11 46          | 13 36          | 15 39          | 17 49          |
| 20                   | 20 6           | 22 11          | 23 59          | 1 52         | 3 48      | 5 55         | 7 58         | 9 58         | 11 50          | 13 40          |                | 17 59          |
| 21                   | 20 10          | 22 15          | 0 3            | 1 56         | 3 52      | 5 59         | 8 2          | 10 1         | 11 54          | 13 44          | 15 47          | 17 58          |
| 22                   | 20 14          | 22 19          | 0 6            | 2 0          | 3 56      | 6 3          | 8 6          | 10 5         | 11 57          | 13 47          |                | 18 2           |
| 23                   | 20 19          | 22 28          | 0 10           | 2 3          | 4 0       | 6 7          | 8 10         | 10 9         | 12 1           | 13 51          |                | 18 7           |
| 24                   | 20 23          | 22 26          | 0 13           | 2 7          | 4 4       | 6 12         | 8 14         | 10 12        | 12. 4          | 13 55          |                | 18 11          |
| 25                   | 20 27          | 22 30          | 0 17           | 2 11         | 4 8       | 6 16         | 8 18         | 10 16        | 12 8           | 13 59          |                | 18 16          |
| 26<br>27             | 20 31<br>20 35 | 22 34<br>22 38 | 0 21           | 2 15 2 19    | 4 12      | 6 20         | 8 22<br>8 26 | 10 20        | 12 12<br>12 15 | 14 3<br>14 7   |                | 18 20          |
| 28                   | 20 39          | 22 42          | 0 28           | 2 22         | 4 20      | 6 28         | 8 30         | 10 27        | 12 19          | 14 10          | 16 13<br>16 17 | 18 25<br>18 29 |
| 29                   | 20 44          | 22 45          | 0 32           | 2 26         | 4 24      | 6 32         | 8 34         | 10 31        | 12 22          | 14 14          | 16 21          | 18 29<br>18 39 |
| 30                   | 29 48          |                | 0 35           | 2 30         | 4 28      | 6 37         | 8 38         | 10 34        | 12 26          |                | 16 26          | 18 38          |
| 31                   | 20 52          |                | 0 39           |              | 4 32      | 1            | 8 42         | 10 38        | ł              | 14 22          |                | 18 4           |
|                      |                |                | T,             | ABLE         | XXIX.     | <b>ÉQU</b> A | MOIT         | OF TI        | ME.            |                |                | ,              |
| , 1                  | Jan.           | Feb.           | March          | April.       | May.      | June.        | July.        | Aug.         | Sept.          | Oct.           | Nov.           | Dec            |
| days -               | Add            | Add            | Add            | Add          | Sub.      | Sub.         | Add          | Add          | Sub.           | Sub.           | Sub.           | Sub            |
| 1                    | 3' 33"         | 13/ 53/        | 12' 39"        | 3' 57"       | 3/ 6"     | 2' 37"       | 3' 20"       | 5' 55"       | 0' 12"         | 10' 22"        | 16' 15"        | ļ              |
| 2                    | 4 1            | 14 1           | 12 26          | 3 39         | 3 13      | 2 28         | 3 31         | <b>5</b> 52  | 0 31           | 10 40          | 16 16          | 10 1           |
| 3                    | 4 30           | i4 8           | 12 13          | 3 21         | 3 20      | 2 19         | 3 43         | 5 47         | 0 50           | 10 58          | 16 14          | 9 5            |
| 4                    | 4 57           | 14 14          | 12 0           | 3 8          | 3 26      | 2 9          | 3 54         | 5 43         | 1 9            | 11 16          | 16 14          | 9 2            |
| 5                    | 5 25           | 14 20          | 11 46          | 2 45         | 3 32      | 1 59         | 4 4          | 5 37         | 1 29.          | 11 34          | 16 13          | 9              |
| 6                    | 5 52           | 14 25          | 11 32          | 2 28         | 3 37      | 1 48         | 4 15 4 25    | 5 31<br>5 25 | 1 48<br>2 8    | 11 51          | 16 10          | 8 3            |
| 7 8                  | 6 18 6 45      | 14 29<br>14 33 | 11 18<br>11 3  | 2 10         | 3 46      | 1 37         | 4 34         | 5 17         | 2 8 2 28       | 12 8<br>12 25  | 16 7<br>16 2   | 8·1:<br>7 4    |
| 9                    | 7 10           | 14 35          | 10 48          | 1 36         | 3 49      | 1 14         | 4 44         | 5 10         | 2 49           | 12 23          | 15 57          | 7 1            |
| 10                   | 7 35           | 14 37          | 10 32          | 1 20         | 3 52      | i s          | 4 52         | 5 1          | 3 9            | 12 57          | 15 51          | 6 50           |
| 11                   | 8 0            | 14 38          | 10 16          | 1 3          | 5 54      | 0 51         | 5 1          | 4 52         | 3 30           | 13 12          | 15 45          | 6 2            |
| 12                   | 8 24           | 14 38          | 10 0           | 0 47         | 3 56      | 0 38         | 5 9          | 4 43         | 3 51           | 19 27          | 15 37          | 5 5            |
|                      | 8 47           | 14 37          | 9 43           | 0 32         | 3 57      | 0 26         | 5 16         | 4 33         | 4 11           | 13 41          | 15 29          | 5 2            |
| 13                   |                | 14 00          | 9 26           | 0 16         | 3 57      | 0 14         | 5 23         | 4. 22        | 4 52           | 13 55          | 15 20          | 4 5            |
| 14                   | 9 10           | 14 36          |                |              | A 1       | '            | # ~~ !       | 4 '          |                |                | I · ·          | I .            |
| 14<br>15             | 9 32           | 14 34          | 9 9            | 0 1          | 3 57      | 0 1          | 5 30         | 4 11         | 4 54           | 14 8           | 15 10          | 4 2            |
| 14<br>15<br>16       | 9 32<br>9 54   | 14 34<br>14 31 | 9 9<br>8 52    | 0 1<br>Sub14 | 3 57      | add12        | 5 36         | 3 59         | 5 15           | 14 21          | 14 59          | 3 5            |
| 14<br>15<br>16<br>17 | 9 32           | 14 34          | 9 9            | 0 1          |           |              |              |              |                | 3              |                | 1              |

| 6<br>7<br>8<br>9<br>10   | 19 5<br>19 10<br>19 14<br>19 19<br>19 23  | 21 12<br>21 16<br>21 20<br>21 24<br>21 28<br>21 32                                     | 23 8<br>23 11<br>23 15<br>23 19  | 1 1<br>1 4<br>1 8<br>1 12<br>1 15   | 2 49<br>2 53<br>2 57<br>3 1<br>3 5<br>3 8  | 4 57<br>5 1<br>5 5<br>5 9<br>5 13  | 7 1<br>7 5<br>7 10<br>7 14<br>7 18   | 9 5<br>9 9<br>9 12<br>9 16<br>9 20   | 11 0<br>11 3<br>11 7<br>11 10<br>11 14   |   | 14 46<br>14 50<br>14 54<br>14 58<br>15 2   | 16 47<br>16 52<br>16 56<br>17 0<br>17 5<br>17 9   |
|--|---|--|--|---|--|--|--|--|--|---|--|---|
| 11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19             | 19 27<br>19 32<br>19 36<br>19 40<br>19 45<br>19 49<br>19 53<br>19 57<br>20 2<br>20 6            | 21 36<br>21 40<br>21 44<br>21 48<br>21 52<br>21 56<br>22 0<br>22 3<br>22 7<br>22 11    | 23 26<br>23 30<br>23 33<br>23 37<br>23 41<br>23 44<br>23 48<br>23 52<br>23 55<br>23 59 | 1 19<br>1 28<br>1 26<br>1 30<br>1 34<br>1 37<br>1 41<br>1 45<br>1 49<br>1 52  | 3 12<br>3 16<br>3 20<br>3 24<br>3 28<br>3 32<br>3 36<br>3 40<br>3 44<br>3 48               | 5 18<br>5 22<br>5 26<br>5 30<br>5 34<br>5 38<br>5 43<br>5 47<br>5 51<br>5 55 | 7 22<br>7 26<br>7 30<br>7 34<br>7 38<br>7 42<br>7 46<br>7 50<br>7 54<br>7 58       | 9 24<br>9 28<br>9 31<br>9 35<br>9 39<br>9 43<br>9 46<br>9 50<br>9 54<br>9 58                 | 11 18<br>11 21<br>11 25<br>11 28<br>11 32<br>11 36<br>11 39<br>11 43<br>11 46<br>11 50 | 13 6<br>18 10<br>18 14<br>18 17<br>18 21<br>18 25<br>13 29<br>13 32<br>13 36<br>15 40 | 15 6<br>15 10<br>15 14<br>15 18<br>15 22<br>15 26<br>15 31<br>15 35<br>15 39<br>15 43  | 17 14<br>17 18<br>17 22<br>17 27<br>17 31<br>17 36<br>17 40<br>17 45<br>17 49<br>17 53        |
| 21<br>22<br>23<br>24<br>25<br>26<br>27<br>28<br>29<br>30<br>31 | 20 10<br>20 14<br>20 19<br>20 23<br>20 27<br>20 31<br>20 35<br>20 39<br>20 44<br>29 48<br>20 52 | 22 15<br>22 19<br>22 28<br>22 26<br>22 30<br>22 34<br>22 38<br>22 42<br>22 45          | 0 3<br>0 6<br>0 10<br>0 13<br>0 17<br>0 21<br>0 24<br>0 28<br>0 32<br>0 35<br>0 39     | 1 56<br>2 0<br>2 3<br>2 7<br>2 11<br>2 15<br>2 19<br>2 22<br>2 26<br>2 30     | 3 52<br>3 56<br>4 0<br>4 4<br>4 8<br>4 12<br>4 16<br>4 20<br>4 24<br>4 28<br>4 32<br>XXIX. | 5 59<br>6 3<br>6 7<br>6 12<br>6 16<br>6 20<br>6 24<br>6 28<br>6 32<br>6 37   | 8 2<br>8 6<br>8 10<br>8 14<br>8 18<br>8 22<br>8 26<br>8 30<br>8 34<br>8 38<br>8 42 | 10 1<br>10 5<br>10 9<br>10 12<br>10 16<br>10 20<br>10 23<br>10 27<br>10 31<br>10 34<br>10 38 | 11 54<br>11 57<br>12 1<br>12 4<br>12 8<br>12 12<br>12 15<br>12 19<br>12 22<br>12 26    |   | 15 47<br>15 51<br>15 56<br>16 0<br>16 4<br>16 8<br>16 13<br>16 17<br>16 21             | 17 58<br>18 2<br>18 7<br>18 11<br>18 16<br>18 20<br>18 25<br>18 29<br>18 33<br>18 38<br>18 42 |
| days   | Jan.<br>Add   | Feb.   | March<br>Add   |   | May.   |  | Julý.  | Aug.   | Sept.  | Oct.  | Nov.   | Dec.  |
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9                      | 3' 33''<br>4 1<br>4 30<br>4 57<br>5 25<br>5 52<br>6 18<br>6 45<br>7 10<br>7 35                  | 13' 53'<br>14 1<br>14 8<br>14 14<br>14 20<br>14 25<br>14 29<br>14 33<br>14 35<br>14 37 | 12' 39"<br>12 26<br>12 13<br>12 0<br>11 46<br>11 32<br>11 18<br>11 3<br>10 48<br>10 32 | 3' 57"<br>3 39<br>3 21<br>3 8<br>9 45<br>2 28<br>2 10<br>1 53<br>1 36<br>1 20 | 3' 6"<br>3 13<br>3 20<br>3 26<br>3 32<br>3 37<br>3 42<br>3 46<br>3 49<br>3 52              | 2' 37"<br>2 28<br>2 19<br>2 9<br>1 59<br>1 48<br>1 37<br>1 26<br>1 14<br>1 3 | 3' 20"<br>3 31<br>3 43<br>3 54<br>4 4<br>4 15<br>4 25<br>4 34<br>4 44<br>4 52      | 5' 55"<br>5 52<br>5 47<br>5 43<br>5 37<br>5 31<br>5 25<br>5 17<br>5 10<br>5 1                | 0' 12"<br>0 31<br>0 50<br>1 9<br>1 29<br>1 48<br>2 8<br>2 28<br>2 49<br>3 9            |   | 16' 15"<br>16 16<br>16 14<br>16 14<br>16 13<br>16 10<br>16 7<br>16 2<br>15 57<br>15 51 | Sub,<br>10' 39'<br>10 16<br>9 52<br>9 27<br>9 2<br>8 37<br>8 11<br>7 44<br>7 17<br>6 50       |
| 11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19             | 8 0<br>8 24<br>8 47<br>9 10<br>9 32<br>9 54<br>10 15<br>10 35<br>10 54<br>11 12                 | 14 38<br>14 38<br>14 37<br>14 36<br>14 34<br>14 31<br>14 27<br>14 23<br>14 18<br>14 12 | 10 16<br>10 0<br>9 43<br>9 26<br>9 9<br>8 52<br>8 34<br>8 17<br>7 59<br>7 40           | 1 3 0 47 0 32 0 16 0 1 Sub14 0 28 0 42 0 56 1 9                               | \$ 54<br>\$ 56<br>\$ 57<br>\$ 57<br>\$ 57<br>\$ 56<br>\$ 54<br>\$ 52<br>\$ 49              | 0 51<br>0 38<br>0 26<br>0 14<br>0 1<br>add12<br>0 24<br>0 37-<br>0 50<br>1 3 | 5 1<br>5 9<br>5 16<br>5 23<br>5 30<br>5 36<br>5 41<br>5 46<br>5 50<br>5 54         | 4 52<br>4 43<br>4 33<br>4 22<br>4 11<br>3 59<br>3 46<br>3 33<br>3 20<br>3 6                  | 3 30<br>3 51<br>4 11<br>4 32<br>4 54<br>5 15<br>5 36<br>5 57<br>6 18<br>6 39           | 13 12<br>13 27<br>13 41<br>13 55<br>14 8<br>14 21<br>14 33<br>14 45<br>14 56<br>15 6  | 15 45<br>15 37<br>15 29<br>15 20<br>15 10<br>14 59<br>14 47<br>14 95<br>14 21<br>14 7  | 6 22<br>5 54<br>5 26<br>4 57<br>4 28<br>3 59<br>3 90<br>3 0<br>2 30<br>2 0                    |
| 21<br>22<br>23<br>24<br>25<br>26<br>27<br>28<br>29<br>30       | 11 30<br>11 47<br>12 3<br>12 19<br>12 38<br>12 47<br>13 0<br>13 12<br>13 23<br>13 34<br>13 44   | 14 5<br>13 58<br>13 50<br>13 42<br>13 33<br>13 23<br>13 13 13<br>15 2<br>12 50         | 7 22<br>7 4<br>6 45<br>6 26<br>6 8<br>5 49<br>5 30<br>5-12<br>4 53<br>4 34<br>4 16     | 1 22<br>1 35<br>1 47<br>1 58<br>2 10<br>2 20<br>2 30<br>2 40<br>2 49<br>2 58  | 3 46<br>3 42<br>3 88<br>9 33<br>3 28<br>8 22<br>3 16<br>9 9<br>9 2<br>2 54                 | 1 16<br>1 29<br>1 41<br>1 54<br>2 7<br>2 19<br>2 32<br>2 44<br>2 56<br>3 8   | 5 57<br>6 0 0<br>6 4 6 5 5<br>6 5 6 4 6 3 6 1 5 58                                 | 2 52<br>2 37<br>2 22<br>2 6<br>1 50<br>1 34<br>1 17<br>1 0<br>0 42<br>0 24<br>0 6            | 7 0<br>7 21<br>7 42<br>8 2<br>8 23<br>8 43<br>9 3<br>9 23<br>9 43<br>10 2              | 15 16<br>18 25<br>15 34<br>15 41<br>15 48<br>15 54<br>16 0<br>16 4<br>16 11           | 19 52<br>19 36<br>13 19<br>13 2<br>12 44<br>12 25<br>12 5<br>11 45<br>11 23<br>11 1    | 1 90<br>1 0<br>0 30<br>0 0 0<br>add30<br>1 0<br>1 29<br>1 59<br>2 29<br>2 58                  |

To Reduce the Time of the Passage of the Moon over the Meridian of Greenwich, to the Time of its Passage over any other Meridian.

|    | Arg. time | -    | Arg. |       | ·   |     |      |     |     |     |     |      |     | idian. |             | Arg.<br>Long. |
|----|-----------|------|------|-------|-----|-----|------|-----|-----|-----|-----|------|-----|--------|-------------|---------------|
| ١, | south.    | 40′  | 42   | 44    | 46′ | 48′ | 50′  | 52' | 54' | 56′ | 58' | 60′  | 62' | 64'    | 6 <b>6′</b> |               |
|    | Óμ Ολ     | C'   | 0'   | U/    | 0'  | 0'  | 0'   | 0′  | 0'  | 0'  | 0'  | 0'   | 0'  | 0'     | 0'          | 00            |
|    | 0 20      | 1    | 1    | 1     | 1   | 1   | 1.   | 1   | ı   | 1   | 1   | 1    | 1   | I      | 1           | 5             |
|    | 0 40      | 1    | 1    | 1     | 1   | . 1 | 1    | . 1 | 1,  | 1   | 2   | 2    | 2   | 2      | 2           | 10            |
|    | 10        | 2    | 2    | 2     | 2   | 2   | 2    | 2   | 2   | 2   | 2   | 2    | 2   | 3      | 3           | 15            |
|    | 1 20      | 2    | 2    | 2     | 2   | 3   | 3    | 8   | 3   | 3   | 3   | 3    | 3   | 8      | 4           | 20            |
|    | 1 40      | 3    | 3    | 3     | 3   | 3   | 3    | 3   | 4   | 4   | 4   | 4    | 4   | 4      | 4           | 25            |
|    | 2 0       | 3    | 3    | 4     | 4   | 4   | 4    | 4   | 4   | 4   | 5   | 5    | 5   | 5      | 5           | 30 \          |
| 1  | 2 20      | 4    | 4    | 4     | . 4 | 5   | 5    | 5   | 5.  | 5   | 5   | 6    | 6   | 6      | 6           | 35<br>40      |
| ١. | 9 40      | 4    | 4    | 5     | 5   | 5   | 5    | 6   | 6   | 6   | 6.  | 6    | 7   | 7      | 7           | 40            |
|    | 3 0       | 5    | 5    | 5     | 6   | 6   | 6    | 6   | 7   | 7   | 7   | 7    | 7   | 8      | 8           | 4.5           |
|    | 3 20      | 5    | 6    | 6.    | 6   | 6   | 7    | 7   | 7   | 7   | 8   | 8    | 8   | 9      | 9           | <i>5</i> 0    |
| i. | 3 40      | 6    | 6    | 7.    | . 7 | 7   | 7    | 8   | 8   | 8   | 9   | 9    | 9   | . 9    | 10          | 55            |
| '  | 4 0       | 6    | 7    | 7     | 7   | 8   | 8    | 8   | 9   | 9   | 9   | 10   | 10  | 10     | 11          | 60            |
| ļ  | 4 20      | 7    | 7    | 8     | 8   | 8   | 9    | 9   | 9   | 10  | 10  | 10   | 11  | 11     | 11          | 65            |
|    | 4 40      | 7    | 8    | 8     | . 9 | 9   | 1.9  | 10  | 10  | 10  | 11  | 11   | 12  | 12     | 12          | 70            |
|    | 5 0       | . 8  | 9    | 9     | 9   | 10  | 10   | 10  | 11  | 11  | 12  | 12   | 12  | 13     | 13          | 75            |
|    | 5 20      | 9    | 9    | 9     | 10  | 10  | 11   | 11  | 12  | 12  | 12  | 13   | 18  | 14     | 14          | 80            |
| !  | 5 40      | و    | 10   | 10    | 11  | 11  | . 11 | 12  | 12  | 13  | 13  | 14   | 14  | 14     | 15          | 85            |
|    | 6 0       | 10   | 10   | 11    | 11  | 12  | 12   | 13  | 13  | 13  | 14  | 14   | 15  | 15     | 16          | 90            |
|    | 6 20      | 10   | 11   | 11    | 12  | 12  | 13   | 13  | 14  | 14  | 15  | . 15 | 16  | 16     | 17          | 95            |
|    | 6 40      | 11   | 11   | 12    | 12  | .13 | 13   | 14  | 14  | 15  | 15  | 16   | 17  | 17     | 18          | 100           |
| ,  | 7 0       | 11   | 12   | 12    | .13 | 14  | 14   | 15  | 15  | 16  | 16  | 17   | 17  | 18     | 18          | 105           |
|    | 7 20      | 12   | 12   | 13    | 14  | 14  | 15   | 15  | 16  | 16  | 17  | 18   | 18  | 19     | 19          | 110           |
|    | 7 40      | 12   | 13   | 14    | 14  | 15  | . 15 | 16  | 17  | 17  | 18  | 18   | 19  | 20     | 20          | 115           |
|    | 8 0       | _ 13 | 14.  | - 14. | 15  | 15- | - 16 | 17  | 17  | 18  | 19  | 19   | 20  | 20     | 21          | 120           |
|    | 8 20      | 13   | 14   | 15    | 15  | 16  | 17   | 17  | 18  | 19  | 19  | 20   | 21  | 21     | 22          | 125           |
|    | 8 40      | 14   | 1.5  | 15    | 16  | 17  | 17   | 18  | 19  | 19  | 20  | 21   | 21  | 22     | 23          | 130           |
| -  | 9 0       | 14   | 15   | 16    | 17: | 17  | 18   | 19  | 20  | 20  | 21  | .22  | 22  | 23     | 24          | . 135         |
|    | 9.20      | 15   | 16   | 17    | 17  | 18- | 19   | 20  | 20  | 21  | 22  | 22   | 23  | 24     | 25          | 140-          |
|    | 9 40      | 15   | 16   | 17    | 18  | 19  | 19   | 20  | 21  | 22  | 22  | 23   | 24  | 25     | 25          | 145           |
|    | 10 0      | 16   | 17   | 18    | 19. | 19  | 20   | 21  | 22  | 22  | 23  | 24   | 25  | 26     | 26          | 150           |
|    | 10 20     | 16   | 18   | 18    | 19  | 20  | 21   | 22  | 22  | 23  | 24  | 25   | 26  | 26     | 27          | 155           |
|    | 10 40     | 17   | 18   | 19    | 20  | 21  | 21   | 22  | 23  | 24  | 25  | 26   | 26  | 27     | 28          | 160           |
|    | 11 0      | 17   | 19   | 20    | 20  | 21  | 22   | 23  | 24  | 25  | 26  | 26   | 27  | 28     | 29          | 165           |
|    | 11 20     | 18   | 19   | 20    | 21  | 22  | 23   | 24  | 25  | 25  | 26  | 27   | 28  | 29     | 30          | 170           |
| :  | 11 40     | 18   | 20   | 21    | 22  | 23  | 23   | 24  | 25  | 26  | 27  | 28   | 29  | 30     | 31          | 175           |
| _  | 12 0      | 19   | 20   | 21    | 22  | 23  | 24   | 25  | 26  | 27  | 28  | 29   | 30  | 31     | 32          | 180           |

### TABLE XXXI.

Error of Observation arising from an Inclination of the Axis of the Telescope, or Line of Sight to the Plane of the Sextant.

| Arg. Obser.                 | 1     |               | Arg   | ;·                | ,    |                        | • | <del></del>              |       | IN                        | CL   | IN'A                       | TI    | ON.  |       |                             |        |                            |         |                                     |         |                | •                                     |
|-----------------------------|-------|---------------|-------|-------------------|------|------------------------|---|--------------------------|-------|---------------------------|------|----------------------------|-------|--|-------|-----------------------------|--------|----------------------------|---------|-------------------------------------|---------|----------------|---------------------------------------|
| angle.                      | 1     | 0             | 5     | 30'               | 9    | 0'                     | 4 | 0'                       |       | 50′                       | 1°   | 0'                         | 19    | 10   | 19    | 20                          | 19     | 30                         | 19      | 40′                                 | 1       | 50′            | 20 0                                  |
| 10°<br>20<br>30<br>40<br>50 | 00000 | 0"            | 00000 | 1"<br>1<br>2<br>3 | 0000 | 1"<br>3<br>4<br>6<br>8 |   | 2"<br>5<br>7<br>10<br>13 | 0'000 | 4"<br>8<br>12<br>16<br>20 | 0000 | 6#<br>11<br>17<br>23<br>29 | 00000 | 7 <sup>3</sup> 1<br>15<br>23<br><b>3</b> 1<br><b>4</b> 0 | 00000 | 10"<br>20<br>30<br>40<br>52 | 0 0 0  | 12#<br>25<br>38<br>51<br>6 | 0 0 1 1 | 1 <i>5</i> "<br>30<br>47<br>4<br>21 | 0 0 1 1 | _              | 0' 22'<br>0 44<br>1 8<br>1 32<br>1 57 |
| 70                          | 0     | $\frac{1}{1}$ | 0     | 5                 | 0    | 9                      |   | 16<br>20                 |       | 25,<br>31                 | 0    | 36<br>44                   | 0     | <b>4</b> 9   | 1     | 18                          | 1      | 21<br>39                   | 2       | 41·                                 | 2       | 28             | 2 25                                  |
| 90<br>100                   | 000   | 2 2 2         | 0 0   | 6<br>7<br>8       | 0    | 13<br>16<br>19         | 0 | 28                       | 0     | 37<br>44<br>52            |      | 53<br>3<br>15.             | 1 1 1 | 12<br>26<br>42   | 1 1 2 | 33<br>52<br>13              | 1 2 2  | 58<br>21<br>49             | 2 2 3   | 26<br>55<br>28                      | 3       | 57<br>31<br>12 | 3 31<br>4 11<br>5 0                   |
| 120                         | 0     | 3             | 0     | 10<br>12          |      | 22<br>27               | 0 | 40<br>48                 | 1     | 2<br>16                   | _    | 30<br>49                   | 2     | 2<br>28  | 3     | 39<br>14                    | 3<br>4 | 21<br>5                    | 4<br>5  | 10<br>2                             | 5<br>6  | 6              | 5 59<br>7 16                          |

#### TABLE XXXII.



### THE CORRECTION OF THE MOON IN ALTITUDE.

| 1             |            |          | TA           | BLE      | XX:        | IIXX      | [.           |          | +          | 1          |             |          | LE XXXIIL                 |
|---------------|------------|----------|--------------|----------|------------|-----------|--------------|----------|------------|------------|-------------|----------|---------------------------|
| THE C         | ORR        | ECT      | ОИ           | OF T     | HE I       | MOO       | N IN         | AL       | rrru:      | DE.        |             |          | ELERATION<br>FIXED STARS. |
| Moon's appar. | Ar         | g.       | The          | Moor     | 's Ho      | rizon     | tal P        | arallà   | x.         |            |             | Part     | I. for Days.              |
| akitude       | 53'        | 54'      | 5 <b>5</b> / | 56/      | 57'        | 581       | <i>5</i> 9′  | 60/      | 61'        | 62'        | -           | Days.    | Acceleration.             |
| 00            | 20′        | 217      | 22/          | 23'      | 24'        | 25        | 26'          | 27'      | 28'        | 23'        |             | 1        | 0" <i>3' 55".</i> 9       |
| 5<br>L        | 29<br>34   | 30<br>35 | 31<br>36     | 32<br>37 | 33<br>38   | 34<br>39  | 35<br>40     | 36<br>41 | 37<br>42   | 38<br>43   |             | 2        | 9 7 51.8<br>0 11 47.7     |
| 3             | 38         | 39       | 40           | 41       | 42         | 43        | 44           | 45       | 46         | 47         | - 11        | 3 4      | 0 11 47.7<br>0 15 43.6    |
| 4 `           | 41         | 42       | 49           | 44       | 45         | 46        | 47           | 48       | 49         | 50         |             | 5        | 0 19 99.5                 |
| 5<br>6        | 43<br>44   | 44       | 45<br>46     | 46<br>47 | 47<br>48   | 48-<br>49 | 49<br>50     | 50<br>51 | 51 .<br>52 | 52<br>53   |             | 6 7      | 0 23 35.4<br>0 27 31.3    |
| 7             | 45         | 46       | 47           | 48       | 49         | 50        | 51           | 52       | 53         | 54         | - 11        | 8        | 0 27 31.3                 |
| 8             | 46         | 47       | 48           | 49       | <i>5</i> 0 | 51        | 52           | 58       | 54         | 55         |             | 9        | 0 35 23.1                 |
| 9             | 47         | 48       | 49           | 49       | 50         | 51        | 52           | 53       | 54、        | 55         |             | 10       | 0 89 19.0                 |
| 10            | 47         | 48       | 49           | 50       | 51         | 52        | 58           | 54       | 55         | 56         |             | 11       | 0 43 14.9                 |
| 11<br>12      | 47         | 48       | 49<br>49     | 50<br>50 | 51<br>51   | 52<br>52  | - 58<br>- 53 | 54<br>54 | 55.<br>55  | 56<br>56   |             | 12<br>13 | 0 47 10.8<br>0 51 6.7     |
| 13            | 48         | 49       | 50           | 51       | 51         | 52        | 53           | 54       | 55.        | 56         |             | 14       | 0 55 2.6                  |
| 14            | 48         | 49       | 50           | 51       | 52         | 53        | 53           | 54       | 55         | 56         |             | 15       | 0 58 58.5                 |
| 15<br>16      | 48<br>48   | 49       | 50<br>50     | 51<br>51 | 52<br>52   | 53<br>52  | 58<br>58     | 54<br>54 | 55<br>55   | 56<br>56   |             | 16<br>17 | 1 2 54.4<br>1 6 50.3      |
| 17            | 48         | 49       | 50           | 50       | 51         | 52        | 53           | 54       | 55         | 56         |             | 18       | 1 10 46 2                 |
| 18            | 47         | 48       | 49           | 50       | 51         | 52        | 53           | 54       | 55         | 56         |             | 19       | 1 14 42.1                 |
| 19            | 47         | 48       | 49           | 50       | 51         | 52        | 53           | 54       | 55         | 56         |             | 20.      | 1 18 38.0                 |
| 20            | 47         | 48       | . 49         | 50       | 51         | 52        | 53           | 54       | 55         | 56         |             | 21       | 1 22 33.9                 |
| 21<br>22      | 47<br>47   | 48       | 49           | 50<br>50 | 51<br>51   | 52<br>51  | 53<br>52     | 54<br>53 | 54<br>-54  | 55<br>55   |             | 22<br>23 | 1 26 29.8<br>1 30 25.7    |
| 23            | 47         | 47       | 48           | 49       | 50         | 51        | 52           | 53       | 54         | 55         |             | 24       | 1 34 21.6                 |
| 24            | 46         | 47       | 48           | 49       | 50         | 51        | 52           | 53       | 54         | 55         |             | 25 .     | 1 38 17.5                 |
| 25<br>26      | 46<br>46   | 47       | 48           | 49<br>48 | 50<br>49   | 51        | 51<br>51     | 52<br>52 | 53<br>53   | .54<br>54  |             | 26<br>27 | 1 42 13.5<br>1 46 9.4     |
| 27            | 45         | 46       | 47           | 48       | 49         | 50<br>50  | 51           | 52       | 52         | 58         |             | 28       | 1 50 5.3                  |
| 28            | 45         | 46       | 47           | 48       | 49         | 49        | 50           | 51       | 52         | 58         |             | 29       | 1 54 1.2                  |
| 29            | 45         | 46       | 46           | 47       | 48         | 49        | 50           | 51       | 52         | 59         |             | 30       | 1 57 57,1                 |
| 30<br>31      | 44         | 45       | 46           | 47       | 48         | 49        | 49           | 50       | 51         | 52<br>52   |             | Part     | II. for Hours.            |
| 32            | 44         | 45       | 46<br>45     | 47       | 47         | 48        | 49           | 50<br>49 | 51<br>50   | 51         |             |          | Acceleration.             |
| 33            | 43         | 44       | 45           | 45       | 46         | 47        | 48           | 49       | 50         | 51         |             | Hours.   |                           |
| 84<br>85      | 42<br>42   | 43       | 44           | 45<br>45 | 46<br>45   | 47        | 47           | 48       | 49         | 50<br>49   |             | 1h       | 0 9%8                     |
| 36            | 42         | 42       | 43           | 44       | 45         | 46        | 46           | 47       | 48         | 49         |             | 3        | 0 19.7<br>0 29.5          |
| 87            | 41         | 42       | 43           | 49       | 44         | 45        | 46           | 47       | 47         | 48         |             | 4        | 0 39.3                    |
| 38<br>39      | 40<br>40   | 41       | 42           | 43<br>42 | 44         | 44        | 45           | 46       | 47 46.     | 48<br>47   |             | 5<br>6   | 0 49.1                    |
| 40            |            | 41       |              | ·        |            | 44        | 45           | 45       | .          |            |             | 7        | 0 59.0<br>1 8.8           |
| 42            | 39<br>38 · | 39       | 41           | 42       | 43         | 49        | 44 43        | 45<br>44 | 46         | 46<br>45   |             | 8        | 1 18.6                    |
| 44            | 37         | 38       | 39           | 39       | 40         | 41        | 41           | 42       | 43         | 44         |             | 9        | 1 28.5                    |
| 46            | 36         | 37       | 37           | 38       | 39         | 39        | 40           | 41       | 41         | 42         |             | 10       | 1 38.3                    |
| 48<br>50      | 35<br>38   | 35<br>34 | 36           | 37       | 37         | 38        | 39           | 39       | 38         | 39         | .           | 11<br>12 | I 48.1<br>1 57.9          |
| 52            | 32         | 32       | 33           | 34       | 34         | 35        | 36           | 36       | 37         | 37         |             | 13       | 2 7.8                     |
| 54            | 30         | 31       | 32           | 32       | 88         | 33        | 34           | 35       | 35         | 36         |             | 14       | 2 17 6                    |
| 56<br>58      | 29<br>27   | 30<br>28 | 30           | 31 29    | 31         | 32        | 32           | 33       | 33         | 34         | <b> </b>  . | 15<br>16 | 2 27.4<br>2 37.3          |
| 60            | 26         | 26       | 27           | 27       | 28         | 28        | 29           | 29       | 30         | .30        | i           | 17       | 2 47.1                    |
| 62            | 24         | 25       | . 25         | 26       | 26         | 27        | 27           | 28       | 28         | 29         |             | 18       | 2 56.9                    |
| 64<br>66      | 22         | 23       | 24           | 24       | 25         | 25        | 25           | 26       | 26         | 27         |             | 19       | 3 6.7                     |
| 68            | 21<br>19   | 20       | 22 20        | 22       | 23         | 23        | 24           | 24       | 24 22      | 25         | 1           | 20<br>21 | 3 16.6<br>3 26.4          |
| 70            | 17         | 18       | 18           | 19       | 19         | 19        | 20           | 20       | 21         | 21         |             | 22       | 3 36.2                    |
| 72            | 16         | 16       | . 17         | 17       | 17         | 18        | 18           | 18       | 19         | 19         |             | 23       | 3 46.1                    |
| 75<br>80      | 13<br>9    | 14       | 14           | 10       | 14<br>10   | 15        | 15           | 15       | 16<br>10   | 16<br>  11 |             | 24       | 3 55.9                    |
| 85            | 5          | 5        | 5            | 5        | 5          | 5         | 5            | 5        | 5          | 5          |             |          |                           |
| on i          | Λ          | 1        | ٨            | a        | n          | n         | n            | 1 0      | n          | l n        | !!          | 1        | -                         |

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|            | 1 (          | 00 . 1                  |              | 0              |              | 20                     |              | 10 1                    | 4            | 0              |           |
|------------|--------------|-------------------------|--------------|----------------|--------------|------------------------|--------------|-------------------------|--------------|----------------|-----------|
| Min.       | N sine.      | N. cos.                 | N. sine.     |                | N. sine.     | N. cos.                | N. sine.     |                         | N. sine.     | <del>-</del>   |           |
| 0          | 01           | 100000                  | 1745         | 99985          | 3490         | 99939                  | 5234         | 99863                   | 6976         | 99756          | 60        |
| . 1        | 29           | 100000                  | 1774.        | 99984          | 3519         | 99938                  | 5268         | 99861                   | 7005         | 99754          | 59        |
| 2          |              | 100000                  | 1803         | 99984          | 3548         | 99937                  | 5292         | 99860                   | 7034<br>7063 | 99752<br>99750 | 58<br>57  |
| 3          |              | 100000                  | 1832         | 99983          | 3577         | 99936                  | 5321         | 99858<br>9 <b>98</b> 57 | 7092         | 99748          | <i>56</i> |
| 4          | 116          | 100009                  | 1862         | 99983          | 3606<br>3635 | 99935                  | 5350<br>5379 | 99855                   | 7121         | 99746          | 55        |
| 5          |              | 100000                  | 1891         | 99982          | 3633<br>3664 | 99934<br>99933         | 5408         | 99854                   | 7150         | 99744          | 54        |
| 6          |              | 100000                  | 1920<br>1949 | 99982<br>99981 | 3693         | 99933                  | 5437         | 99852                   | 7179         | 99742          | 53        |
| . 7        |              | 100000<br>100000        | 1978         | 99980          | 3723         | 99931                  | 5466         | 99851                   | 7208         | 99740          | 52        |
| 8<br>9     | 262          | 100000                  | 2007         | 99980          | 3752         | 99930                  | 5495         | 99849                   | 7237         | 99738          | 51        |
|            | 291          | 100000                  | 2036         | 99979          | 3781         | 99929                  | 5524         | 99847                   | 7266         | 99736          | 50        |
| 11         | 320          | 99999                   | 2065         | 99979          | 3810         | 99927                  | 5553         | 99846                   | 7295         | 99734          | 49        |
| 12         | 349          | 99999                   | 2094         | 99978          | 3839         | 99926                  | 5582         | 99844                   | 7324         | 99731          | 48        |
| 13.        | 378          | 99999                   | 2123         | . 99977        | 3868         | 99925                  | 5611         | 99842                   | 7353         | 99729          | 47        |
| 14         | 407          | 99 <b>99</b> 9          | 2152         | 99977          | 3897         | 99924                  | 5640         | 99841                   | 7382         | 99727          | 46        |
| 15         | 436          | 99999                   | 2181         | 99976          | 3926         | 99923                  | 5669         | 99839                   | 7411         | 99725          | 45        |
| 16         | 465          | 99999                   | 2211         | 99976          | 3955         | 99922                  | 5698         | 99838                   | 7440         | 99723          | 44<br>43  |
| 17         | 495          | 99999                   | 2240         | 99975          | 3984         | 99921                  | 5727         | 99836                   | 7469<br>7498 | 99721          | 42        |
| 18         | 524          | 99999                   | 2269         | 99974          | 4013         | 99919                  | 5756         | 99834                   | 7527         | 99719<br>99716 | 41        |
| 19         | 553          | 99998                   | 2298         | 99974          | 4042         | 99918                  | 5785         | 99833                   |              |                | 40        |
| 20         | 582          | 99998                   | 2327         | 99973          | 4071         | 99917                  | 5814         | 99831                   | 7556         | 99714          | . 39      |
| 21         | 611          | 99998                   | 2356         | 99972          | 4100<br>4129 | 99916<br>99915         | 5844<br>5873 | 99829<br>99827          | 7585<br>7614 | 99712          | 38        |
| 22         | 640          | 99998                   | 2385         | 99972          | 4129         | 99913                  | 5902         | 99826                   | 7643         | 99708          | 37        |
| 23         | 669          | 99938                   | 2414         | 99971          | 4139         | 99912                  | 5931         | 99824                   | 7672         | 99705          | 36        |
| 24         | 698          | 99998<br>99997          | 2443<br>2472 | 99970<br>99969 | 4217         | 99911                  | 5960         | 99822                   | 7701         | 99703          | 35        |
| 25<br>26   | 727<br>756   | 99997                   | 2501         | 99969          | 4246         | 9991Q                  | 5989         | 99821                   | 7730         | 99701          | 34        |
| 20<br>27   | 785          | 99997                   | 2530         | 99968          | 4275         | 99909                  | 6018         | 99819                   | 7759         | 99699          | 33        |
| 28         | 814          | 99997                   | 2560         | 99967          | 4304         | 99907                  | 6047         | 99817                   | 7788         | 99696          | 32        |
| 29         | 844          | 99996                   | 2589         | 99966          | 4333         | 99906                  | 6076         | 99815                   | 7817         | 99694          | 31        |
| 30 .       | 873          | 99996                   | 2618         | 99966          | 4362         | 99905                  | 6105         | 99813                   | 7846         | 99692          | 30<br>29  |
| 31         | 902          | 99996                   | 2647         | 99965          | 4391         | 99904<br>99902         | 6134         | 99812<br>99810          | 7875<br>7904 | 99689<br>99687 | 28        |
| 32         | - 931        | 99996                   | 2676         | 99964          | 4420<br>4449 | 99902                  | 6163<br>6192 | 99808                   | 7933         | 99685          | 97        |
| 33         | 960          | 99995<br>99995          | 2705<br>2734 | 99963<br>99963 | 4478         | 99900                  | 6221         | 99806                   | 7962         | 99683          | 26        |
| 34<br>35   | 989<br>1018  | 99995                   | 2763         | 99962          | 4507         | 99898                  | 6250         | 99804                   | 7991         | 99680          | 25        |
| 36         | 1047         | 99995                   | 2792         | 99961          | 4536         | 99897                  | 6279         | 99803                   | 8020         | 99678          | 24        |
| 37         | 1076         | 99994                   | 2821         | 9996Q          | 4565         | 99896                  | 6308         | 99801                   | 8049         | 99676          | 23        |
| 38         | 1105         | 99994                   | 2850         | 99959          | 4594         | 99894                  | 6337         | 99799                   | 8078         | 99673          | 22        |
| 39         | 1134         | 99994                   | 2879         | 99959          | 4623         | 99893                  | 6366         | 99797                   | 8107         | ·99671         | 21        |
| 40         | 1164         | 99993                   | 2908         | 99958          | 4653         | 99892                  | 6395         | 99795                   | 8136         | 99668          | 20<br>19  |
| 41.        | 1193         | 99993                   | 2938         | 99957          | 4682<br>4711 | 9989 <b>0</b><br>99889 | 6424<br>6453 | 99793<br>99792          | 8165<br>8194 | 99666<br>99664 | 18        |
| 42         | 1222         | 99993                   | 2967         | 99956          | 4711         | 99888                  | 6482         | 99792                   | 82 <b>23</b> | 99661          | 17        |
| 43<br>44   | 1251<br>1280 | 99992<br>99992          | 2996<br>3025 | 99955<br>99954 | 4769         | 99886                  | 6511         | 99788                   | 82 <b>52</b> | 99659          | 16        |
| 45         | 1309         | 99992                   | 3054         | 99953          | 4798         | 99885                  | 6540         | 99786                   | 8281         | 99657          | 15        |
| 46         | 1338         | 99991                   | 3034<br>3083 | 99952          | 4827         | 99883                  | 6569         | 99784                   | 8310         | 99654          | 14        |
| 47         | 1367         | 99991                   | 3112         | 99952          | 4856         | 99882                  | 6598         | 99782                   | 8339         | 99652          | 13        |
| 48         | 1396         | 99990                   | 3141         | 99951          | 4885         | 99881                  | 6627         | 99780                   | 8368         | 99649          | 12        |
| 49         | 1425         | 99990                   | 3170         | 99950          | 4914         | 99879                  | 6656         | 99778                   | 8397         | 99647          | 11        |
| 50         | 1454         | 99989                   | 3199         | 99949          | 4943         | 99878                  | 6685         | 99776                   | 8426         | 99644          | 10        |
| 51<br>50   | 1483         | 99989                   | 3228         | 99948          | 4972<br>5001 | 99876                  | 6714         | 99774<br>99772          | 8455         | 99642          | 8         |
| 52         | 1513         | 99989                   | 3257         | 99947          | 5001         | 99875                  | 6743<br>6773 | 99772                   | 8484<br>8513 | 99639<br>99637 | 7         |
| 53<br>54   | 1542<br>1571 | 99988<br>9 <b>99</b> 88 | 3286<br>3316 | 99946          | 5030<br>5059 | 99873<br>99872         | 6802         | 99768                   | 8542         | 99635          | 6         |
| 55         | 1600         | 99987                   | 3345         | 99944          | 5088         | 99870                  | 6831         | 99766                   | 8571         | 99632          | 5         |
| <b>5</b> 6 | 1629         | 99987                   | 3374         | 99943          | 5117         | 99869                  | 6860         | 99764                   | 8600         | 99630          | 4         |
| 57         | 1658         | 99986                   | 3403         | 99942          | 5146         | 99867                  | 6889         | 99762                   | 8629         | 99627          | 3         |
| 58         | 1687         | 99986                   | 3432         | 99941          | 5175         | 99866                  | 6918         | 99760                   | 8658         | 99625          | 2         |
| 59         | 1716         | 99985                   | 3461         | 99940          | 5205         | 99864                  | 6947         | 99758                   | 8687         | 99622          | 1         |
| 60         | 1745         | 99985                   | 3490         | 99939          | 5234         | 99863                  | 6976         | 99756                   | 8716         | 99619          | 0         |
| -          | 1            | N. sine.                |              | N. sine        | ·            |                        | ,            |                         |              | N. sine.       | Min       |
|            | 1 8          | 90                      | 8            | 80             | 8            | 170                    | 1 8          | 96 <sub>0</sub>         | 8            | 5°             | <u> </u>  |

| Min.         N. sine         N. cos.         N. sine           1         8716         99619         10453           1         8745         99617         10482           2         8774         99614         10511           3         8803         99612         10569           4         8831         99609         10569           5         8860         99607         10597           6         8889         99604         10626           7         8918         99602         10559           8         8947         99599         10684           9         8976         99596         10713           10         9005         99594         10742           11         9034         99591         10771           12         9063         99586         10802           13         9092         99586         10823           14         9121         99538         10860           15         9150         99586         10887           16         9179         99578         10943           17         9208         99575         10943   | 99452<br>99449<br>99446<br>99443<br>99443<br>99431<br>99424<br>99421<br>99418<br>99415<br>99409<br>99406<br>99402<br>99399<br>99396<br>99386<br>99383<br>99374<br>99370<br>99377<br>99367<br>99360          | N. sine. 12187 12216 12245 12274 12302 12331 12360 12389 12418 12476 12594 12593 12562 12591 12660 12766 12785 12764 12793 12822 12851 12880 12908 12908 12908 12908 12908 12908 12908 12908 12908 12908 12908 12908 12908 12908 12908  | 99255<br>99251<br>99244<br>99244<br>99247<br>99237<br>99233<br>99220<br>99225<br>99215<br>99215<br>99211<br>99200<br>99197<br>99193<br>99186<br>99178<br>99178<br>99175<br>99175<br>99175<br>99175<br>99167<br>99163<br>99160<br>99152<br>99148 | N. sine.  13917 13946 13975 14004 14033 14061 14109 14118 14177 14205 14234 14292 14378 14406 14403 14522 14550 14608 14637 14668 14695 14752  |  | N. sine.  15643 15672 15701 15730 15758 15816 15845 15873 15902 15931 15932 15988 16017 16046 16074 16103 16132 16160 16189 16218 16246 16275 16304 16333 16361 16390 16419 16447 16476  | 98769 98764 98769 98765 987764 987765 98771 98746 98741 98792 98728 98728 98728 98728 98704 98700 98695 98696 98681  98676 98677 98662 98648 98648 98643 98638   | 600<br>559<br>557<br>555<br>554<br>553<br>552<br>51<br>50<br>48<br>47<br>44<br>43<br>42<br>41<br>40<br>39<br>38<br>37<br>36<br>36<br>37<br>36<br>36<br>37<br>38<br>38<br>37<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38 |
|--|---|---|---|--|--|--|--|---|
| 0   8716   99619   10453   1   8745   99617   10482   2   8774   99614   10511   3   8803   99612   10540   4   8831   99609   10569   5   8860   99607   10597   6   8889   99604   10626   7   8918   99602   10655   8   8947   99599   10684   9   8976   99596   10713   10   9005   99594   10771   12   9063   99588   10800   13   9092   99586   10887   14   9121   99583   10882   14   9121   99583   10887   15   9150   99586   10887   16   9179   99578   10916   17   9208   99575   10943   18   9237   99575   10943   19   9266   99570   11002   20   9295   99567   11031   21   9324   99564   11060   22   9353   99559   11118   23   9382   99559   11117   25   9440   99553   11176   26   9469   99553   11176   26   9469   99553   11203   27   9498   99548   11234   28   9527   99548   11234   28   9527   99548   11234   28   9527   99546   11230   31   9614   99537   11348   32   9642   99534   11378   33   9671   99531   11405   34   9700   99528   11465   36   9758   99520   11523   38   9816   99517   11550   38   9816   99517   11550   38   9816   99517   11550   38   9845   99514   11580   41   9903   99508   11638   42   9932   99506   11667   43   9961   99503   11696   44   9990   99500   11725   45   10019   99497   11754   45   10019   | 99452<br>99449<br>99446<br>99443<br>99443<br>99431<br>99424<br>99421<br>99418<br>99415<br>99409<br>99406<br>99402<br>99399<br>99396<br>99386<br>99383<br>99374<br>99370<br>99377<br>99367<br>99360          | 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| 1         8745         99617         10482           2         8774         99614         10511           3         8803         99612         10540           4         8831         99607         10597           6         8889         99604         10626           7         8918         99602         10653           8         8947         99599         10684           9         8976         99596         10713           10         9005         99594         10742           11         9034         99591         10771           12         9063         99586         10829           13         9092         99586         10829           14         9121         99580         10887           15         9150         99580         10887           16         9179         99578         10948           17         9208         99575         10943           18         9237         99572         10973           19         9266         99570         11002           20         9295         99575         10943 <t< td=""><td>99449 99446 99443 99437 99437 99434 99421 99421 99415 99415 99406 99402 99396 99396 99397 99367 99367 99367 99357</td><td>12216<br/>12245<br/>12274<br/>12302<br/>12331<br/>12360<br/>12389<br/>12418<br/>12447<br/>12594<br/>12593<br/>12562<br/>12649<br/>12678<br/>12764<br/>12793<br/>12822<br/>12851<br/>12880<br/>12908<br/>12908<br/>12908<br/>12917<br/>1292<br/>1202<br/>1203<br/>1203<br/>1203<br/>1203<br/>1203<br/>1203<br/>120</td><td>99251<br/>99248<br/>99244<br/>99229<br/>99233<br/>99233<br/>99230<br/>99226<br/>99222<br/>99215<br/>99215<br/>99204<br/>99200<br/>99197<br/>99186<br/>99186<br/>99188<br/>99178<br/>99175<br/>99177<br/>99163<br/>99160<br/>99152<br/>99148</td><td>13946<br/>13975<br/>14004<br/>14033<br/>14061<br/>14090<br/>14119<br/>14148<br/>14177<br/>14205<br/>14234<br/>14292<br/>14378<br/>14292<br/>14378<br/>14464<br/>14464<br/>14464<br/>14463<br/>14525<br/>14551<br/>14580<br/>14608<br/>14637<br/>14668<br/>14695<br/>14723<br/>14752</td><td>99023<br/>99019<br/>99015<br/>99011<br/>99006<br/>99002<br/>98998<br/>98994<br/>98996<br/>98965<br/>98965<br/>98965<br/>98965<br/>98965<br/>98965<br/>98965<br/>98961<br/>98931<br/>98944<br/>98931<br/>98931<br/>98914<br/>98930<br/>98966</td><td>15672<br/>15701<br/>15736<br/>15758<br/>15787<br/>15816<br/>15845<br/>15873<br/>15902<br/>15931<br/>15959<br/>15988<br/>16017<br/>16103<br/>16103<br/>16103<br/>16160<br/>16189<br/>16246<br/>16275<br/>16304<br/>16333<br/>1633<br/>1633<br/>16419<br/>16447,</td><td>98764<br/>98760<br/>98755<br/>98755<br/>98746<br/>98741<br/>98737<br/>98732<br/>98728<br/>98718<br/>98704<br/>98709<br/>98695<br/>98690<br/>98686<br/>98671<br/>98676<br/>98677<br/>98662<br/>98657<br/>98652<br/>98653<br/>98638<br/>98633</td><td>59<br/>58<br/>57<br/>56<br/>53<br/>52<br/>51<br/>50<br/>48<br/>47<br/>46<br/>45<br/>44<br/>42<br/>41<br/>40<br/>39<br/>38<br/>37<br/>36<br/>35<br/>35<br/>36<br/>37<br/>38<br/>38<br/>38<br/>38<br/>38<br/>38<br/>38<br/>38<br/>38<br/>38</td></t<> | 99449 99446 99443 99437 99437 99434 99421 99421 99415 99415 99406 99402 99396 99396 99397 99367 99367 99367 99357   | 12216<br>12245<br>12274<br>12302<br>12331<br>12360<br>12389<br>12418<br>12447<br>12594<br>12593<br>12562<br>12649<br>12678<br>12764<br>12793<br>12822<br>12851<br>12880<br>12908<br>12908<br>12908<br>12917<br>1292<br>1202<br>1203<br>1203<br>1203<br>1203<br>1203<br>1203<br>120  | 99251<br>99248<br>99244<br>99229<br>99233<br>99233<br>99230<br>99226<br>99222<br>99215<br>99215<br>99204<br>99200<br>99197<br>99186<br>99186<br>99188<br>99178<br>99175<br>99177<br>99163<br>99160<br>99152<br>99148                            | 13946<br>13975<br>14004<br>14033<br>14061<br>14090<br>14119<br>14148<br>14177<br>14205<br>14234<br>14292<br>14378<br>14292<br>14378<br>14464<br>14464<br>14464<br>14463<br>14525<br>14551<br>14580<br>14608<br>14637<br>14668<br>14695<br>14723<br>14752 | 99023<br>99019<br>99015<br>99011<br>99006<br>99002<br>98998<br>98994<br>98996<br>98965<br>98965<br>98965<br>98965<br>98965<br>98965<br>98965<br>98961<br>98931<br>98944<br>98931<br>98931<br>98914<br>98930<br>98966 | 15672<br>15701<br>15736<br>15758<br>15787<br>15816<br>15845<br>15873<br>15902<br>15931<br>15959<br>15988<br>16017<br>16103<br>16103<br>16103<br>16160<br>16189<br>16246<br>16275<br>16304<br>16333<br>1633<br>1633<br>16419<br>16447,                            | 98764<br>98760<br>98755<br>98755<br>98746<br>98741<br>98737<br>98732<br>98728<br>98718<br>98704<br>98709<br>98695<br>98690<br>98686<br>98671<br>98676<br>98677<br>98662<br>98657<br>98652<br>98653<br>98638<br>98633                   | 59<br>58<br>57<br>56<br>53<br>52<br>51<br>50<br>48<br>47<br>46<br>45<br>44<br>42<br>41<br>40<br>39<br>38<br>37<br>36<br>35<br>35<br>36<br>37<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38  |
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| 3         8803         99612         10540           4         8831         99609         10569           5         8860         99607         10597           6         8889         99604         10626           7         8918         99602         10655           8         8947         99599         106742           9         8976         99596         10713           10         9005         99594         10742           11         9043         99591         10774           11         9063         99588         10800           13         9092         99586         10829           14         9121         99583         10887           15         9150         99578         10948           16         9179         99578         10948           17         9208         99575         10948           18         9237         99576         11032           21         9324         99570         11003           21         9324         99571         11032           23         9382         99579         11146  | 99443<br>99140<br>99437<br>99434<br>99431<br>99424<br>99421<br>99415<br>99419<br>99409<br>99402<br>99399<br>99396<br>99393<br>99396<br>99393<br>99396<br>99396<br>99396<br>99396                            | 12974 12302 12331 12360 12389 12418 12447 12476 12504 12533 12562 12591 12649 12678 12764 12785 12764 12793 12822 12851 12880 12908 12937 12966 12995 13024   | 99244<br>99240<br>99287<br>99233<br>99230<br>99226<br>99222<br>99215<br>99215<br>99204<br>99200<br>99197<br>99186<br>99186<br>99186<br>99178<br>99175<br>99171<br>99163<br>99166<br>99166<br>99152<br>99148                                     | 14004<br>14033<br>14061<br>14090<br>14119<br>14148<br>14177<br>14205<br>14293<br>14292<br>14320<br>14349<br>14407<br>14436<br>14464<br>14493<br>14522<br>14551<br>14580<br>14608<br>14608<br>14635<br>14695<br>14723<br>14752                            | 99015<br>99011<br>99002<br>98998<br>98994<br>98990<br>98986<br>98983<br>98973<br>98965<br>98961<br>98944<br>98944<br>98946<br>98931<br>98949<br>98931<br>98914<br>98910<br>98916                                     | 15730<br>15758<br>15787<br>15816<br>15845<br>15873<br>15902<br>15931<br>15959<br>15958<br>16017<br>16046<br>16103<br>16132<br>16160<br>16189<br>16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447,                                   | 98755 98751 98741 98737 98732 98723 98723 98714 98709 98704 98709 98686 98681 98676 98667 98662 98657 98658 98638 98638  | 577 566 555 544 533 522 511 499 447 466 455 444 433 422 411 400 399 537 366 355 344 333 522 51  |
| 3         8803         99612         10540           4         8831         99609         10569           5         8860         99607         10597           6         8889         99604         10626           7         8918         99602         10655           8         8947         99599         10649           9         8976         99596         10713           10         9005         99594         10742           11         9043         99581         10802           13         9092         99580         10882           14         9121         99580         10887           16         9179         99578         10916           17         9208         99575         10945           18         9237         99572         10973           19         9266         99570         11002           20         9295         99567         11031           21         9324         99564         11060           22         9353         99562         11089           23         9382         99553         11146           <   | 99:140 99437 99434 99431 99428 99421 99418 99415 99412 99409 99406 99402 99399 99396 99393 99386 99383 99380 99386 99387 99374 99374 99370 99367 99367 99357  | 12302<br>12331<br>12369<br>12418<br>12447<br>12504<br>12533<br>12562<br>12591<br>12620<br>12649<br>12766<br>12785<br>12764<br>12793<br>12822<br>12851<br>12880<br>12908<br>12908<br>12908<br>12995<br>13024   | 99240<br>99237<br>99233<br>99230<br>99226<br>99222<br>99215<br>99215<br>99204<br>99200<br>99197<br>99193<br>99186<br>99188<br>99175<br>99175<br>99177<br>99163<br>99166<br>99152<br>99148   | 14033<br>14061<br>14090<br>14119<br>14148<br>14177<br>14205<br>14203<br>14203<br>14202<br>14320<br>14349<br>14470<br>14436<br>14404<br>14493<br>14521<br>14580<br>14608<br>14636<br>14695<br>14723<br>14752  | 99011<br>99006<br>99009<br>98998<br>98994<br>98990<br>98986<br>98973<br>98965<br>98961<br>98957<br>98957<br>98944<br>98940<br>98931<br>98927<br>98914<br>98914<br>98910<br>98916                                     | 15758<br>15787<br>15816<br>15845<br>15873<br>15902<br>15931<br>15959<br>15988<br>16017<br>16046<br>16192<br>16160<br>16189<br>16218<br>16275<br>16304<br>16333<br>1633<br>16361<br>16390<br>16419<br>16447,<br>16476   | 98751 98746 98741 98737 98732 98728 98728 98718 98719 98704 98700 98695 98690 98686 98681 98676 98677 98662 98652 98643 98638  | 566<br>555<br>544<br>53<br>52<br>51<br>50<br>49<br>48<br>47<br>46<br>43<br>42<br>41<br>40<br>39<br>38<br>37<br>36<br>35<br>37<br>36<br>37<br>36<br>37<br>36<br>37<br>37<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38<br>38     |
| 5         8860         99607         10597           6         8889         99604         10626           7         8918         99602         10653           8         8947         99599         10684           9         8976         99596         10713           10         9005         99594         10742           11         9034         99591         10771           12         9063         99588         10800           13         9092         99588         10826           14         9121         99580         10887           15         9150         99580         10887           16         9179         99573         10946           17         9208         99570         1093           18         9237         99572         10973           19         9266         99570         11060           21         9324         99564         11060           22         9353         99552         11089           23         9382         99553         11147           25         9440         99553         11142  | 99437<br>99434<br>99431<br>99428<br>99424<br>99421<br>99415<br>99419<br>99406<br>99402<br>99399<br>99396<br>99393<br>99386<br>99387<br>99377<br>99374<br>99370<br>99377<br>99374<br>99370                   | 12331<br>12360<br>12389<br>12418<br>12447<br>12504<br>12533<br>12562<br>12591<br>12620<br>12649<br>12764<br>12773<br>12822<br>12851<br>12880<br>12908<br>12908<br>12908<br>12995<br>13024   | 99237<br>99233<br>99250<br>99226<br>99222<br>99215<br>99215<br>99204<br>99200<br>99197<br>99193<br>99186<br>99186<br>99178<br>99175<br>99177<br>99163<br>99160<br>99156<br>99152<br>99148   | 14061<br>14090<br>14119<br>14148<br>14177<br>14205<br>14234<br>14292<br>14320<br>14349<br>14378<br>14464<br>14464<br>14493<br>14522<br>14551<br>14580<br>14608<br>14637<br>14686<br>14695<br>14723<br>14752  | 99006<br>99002<br>98998<br>98994<br>98990<br>98986<br>98978<br>98965<br>98965<br>98961<br>98953<br>98944<br>98940<br>98931<br>98912<br>98914<br>98930<br>98966   | 15787<br>15816<br>15845<br>15873<br>15902<br>15931<br>15959<br>15988<br>16017<br>16046<br>16103<br>16132<br>16160<br>16189<br>16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.   | 98746<br>98741<br>98732<br>98732<br>98728<br>98728<br>98718<br>98704<br>98700<br>98695<br>98695<br>98686<br>98681<br>98676<br>98676<br>98657<br>98652<br>98648<br>98643<br>98638   | 5554<br>533<br>522<br>51<br>50<br>49<br>48, 47<br>46<br>42<br>41<br>40<br>399<br>38<br>37<br>36<br>35<br>35<br>35<br>35<br>31<br>31<br>31<br>31<br>31<br>31<br>31<br>31<br>31<br>31<br>31<br>31<br>31   |
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| 10         9005         99594         10742           11         9034         99591         10771           12         9063         99588         10800           13         9092         99580         10882           14         9121         99583         10858           16         9179         99578         10916           17         9208         99575         10945           18         9237         99572         10973           19         9266         99570         11002           20         9295         99567         11031           21         9324         99564         11060           22         9353         99562         11089           23         9382         99559         11116           24         9411         99553         11176           25         9440         99553         11126           27         9498         99542         11291           30         9585         99540         11320           31         9614         99531         1149           32         9642         99534         11263   | 99421<br>99418<br>99415<br>99419<br>99406<br>99402<br>99399<br>99396<br>99386<br>99383<br>99380<br>99377<br>99367<br>99360<br>99357   | 12476<br>12504<br>12533<br>12562<br>12591<br>12620<br>12649<br>12678<br>12706<br>12785<br>12764<br>12793<br>12822<br>12851<br>12880<br>12908<br>12908<br>12908<br>12905<br>13024  | 99219<br>99215<br>99215<br>99211<br>99204<br>99200<br>99197<br>99193<br>99186<br>99182<br>99178<br>99171<br>99167<br>99163<br>99166<br>99156<br>99156<br>99152<br>99148   | 14%05<br>14234<br>14263<br>14292<br>14320<br>14349<br>14378<br>14407<br>14436<br>14464<br>14463<br>14522<br>14551<br>14580<br>14608<br>14635<br>14695<br>14723<br>14752  | 98986<br>98982<br>98978<br>98969<br>98965<br>98961<br>98957<br>98944<br>98944<br>98946<br>98936<br>98931<br>98927<br>98923<br>98919<br>98914<br>98910  | 15931<br>15959<br>15988<br>16017<br>16046<br>16074<br>16103<br>16132<br>16160<br>16189<br>16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.   | 98723<br>98718<br>98714<br>98709<br>98704<br>98700<br>98695<br>98695<br>98686<br>98671<br>98676<br>98677<br>98652<br>98643<br>98643<br>98638   | 500<br>499<br>488<br>477<br>466<br>455<br>444<br>433<br>422<br>411<br>400<br>399<br>388<br>377<br>366<br>355<br>34<br>333<br>322<br>311   |
| 11         9034         99591         10771           12         9063         99588         10802           13         9092         99586         10829           14         9121         99580         10887           15         9150         99580         10887           16         9179         99578         10946           17         9208         99572         10973           18         9237         99572         10973           19         9266         99570         11002           20         9295         99567         11031           21         9324         99564         11060           22         9353         99562         11089           23         9382         99553         11176           26         9469         99553         11176           26         9469         99551         11205           27         9498         99542         11291           30         9585         99542         11291           30         9585         99542         11291           31         9614         99531         11405  | 99418<br>99415<br>99419<br>99409<br>99406<br>99402<br>99399<br>99396<br>99393<br>99386<br>99387<br>99377<br>99374<br>99370<br>99377<br>99367<br>99367<br>99369  | 12504<br>12533<br>12562<br>12591<br>12620<br>12649<br>12763<br>12764<br>12793<br>12822<br>12851<br>12908<br>12908<br>12908<br>12908<br>12905<br>13024   | 99215<br>99211<br>99208<br>99200<br>99197<br>99193<br>99186<br>99186<br>99175<br>99175<br>99177<br>99167<br>99160<br>99156<br>99152<br>99148  | 14234<br>14263<br>14292<br>14320<br>14378<br>14407<br>14436<br>14464<br>14551<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752   | 98982<br>98978<br>98973<br>98965<br>98965<br>98961<br>98957<br>98944<br>98940<br>98936<br>98931<br>98927<br>98923<br>98914<br>98910<br>98906   | 15959<br>15988<br>16017<br>16046<br>16074<br>16103<br>16132<br>16160<br>16189<br>16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.  | 98718<br>98714<br>98709<br>98700<br>98695<br>98690<br>98681<br>98671<br>98677<br>98662<br>98657<br>98657<br>98648<br>98648<br>98643  | 49<br>48<br>47<br>46<br>45<br>44<br>42<br>41<br>40<br>39<br>38<br>37<br>36<br>35<br>34<br>33<br>32  |
| 11         9034         99591         10771           12         9063         99588         10800           13         9092         99586         10829           14         9121         99580         10887           15         9150         99580         10887           16         9179         99578         10946           17         9208         99575         10945           18         9237         99572         10973           19         9266         99570         11002           20         9295         99567         11031           21         9324         99564         11060           22         9553         99562         11082           23         9382         99559         11118           25         9440         99553         11176           26         9469         99551         11905           27         9498         99548         11234           28         9527         99540         11320           31         9614         99587         11348           32         9642         99584         11378  | 99418<br>99415<br>99419<br>99409<br>99406<br>99402<br>99399<br>99396<br>99393<br>99386<br>99387<br>99377<br>99374<br>99370<br>99377<br>99367<br>99367<br>99369  | 12504<br>12533<br>12562<br>12591<br>12620<br>12649<br>12763<br>12764<br>12793<br>12822<br>12851<br>12908<br>12908<br>12908<br>12908<br>12905<br>13024   | 99215<br>99211<br>99208<br>99200<br>99197<br>99193<br>99186<br>99186<br>99175<br>99175<br>99177<br>99167<br>99160<br>99156<br>99152<br>99148  | 14263<br>14292<br>14390<br>14349<br>14378<br>14407<br>14436<br>14464<br>14464<br>14591<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752  | 98978<br>98973<br>98969<br>98965<br>98961<br>98953<br>98944<br>98944<br>98946<br>98936<br>98931<br>98927<br>98923<br>98919<br>98914<br>98906   | 15988<br>16017<br>16046<br>16074<br>16103<br>16132<br>16160<br>16189<br>16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.   | 98714<br>98709<br>98704<br>98700<br>98695<br>98695<br>98686<br>98681<br>98676<br>98677<br>98662<br>98657<br>98652<br>98643<br>98638  | 48<br>47<br>46<br>45<br>44<br>48<br>42<br>41<br>40<br>39<br>38<br>37<br>36<br>95<br>34<br>33<br>32  |
| 12   | 99415<br>99419<br>99409<br>99406<br>99402<br>99399<br>99396<br>99386<br>99386<br>99377<br>99374<br>99360<br>99377   | 12583<br>12562<br>12591<br>12620<br>12649<br>12678<br>12706<br>12785<br>12764<br>12793<br>12822<br>12851<br>12880<br>12908<br>12908<br>12937<br>12966<br>12995<br>13024   | 99211<br>99208<br>99204<br>99200<br>99197<br>99193<br>99189<br>99186<br>99175<br>99171<br>99167<br>99163<br>99166<br>99152<br>99148   | 14292<br>14320<br>14378<br>14378<br>14407<br>14436<br>14464<br>14493<br>14552<br>14551<br>14580<br>14608<br>14608<br>14695<br>14723<br>14752   | 98973<br>98969<br>98965<br>98961<br>98957<br>98948<br>98944<br>98940<br>98931<br>98927<br>98923<br>98919<br>98914<br>98910   | 16017<br>16046<br>16074<br>16103<br>16132<br>16160<br>16189<br>16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.  | 98709<br>98704<br>98704<br>98695<br>98695<br>98696<br>98681<br>98676<br>98677<br>98662<br>98657<br>98652<br>98648<br>98643<br>98638  | 47<br>46<br>45<br>44<br>43<br>42<br>41<br>40<br>39<br>38<br>37<br>36<br>35<br>34<br>33<br>92  |
| 13         9092         99586         10829           14         9121         99580         10885           15         9150         99580         10886           16         9179         99578         10945           17         9208         99575         10945           18         9237         99572         10973           19         9266         99570         11002           21         9324         99564         11060           22         9353         99562         11089           23         9382         99559         11118           24         9411         99553         11176           25         9469         99551         11263           27         9498         99548         11263           27         9498         99542         11291           30         9585         99540         11320           31         9614         99531         11263           32         9642         99534         11378           33         9671         99531         11494           35         9758         99528         11445  | 99412<br>99409<br>99406<br>99402<br>99399<br>99396<br>99380<br>99380<br>99377<br>99374<br>99370<br>99364<br>99380   | 12562<br>12591<br>12620<br>12649<br>12678<br>12706<br>12785<br>12764<br>12793<br>12822<br>12851<br>12880<br>12908<br>12937<br>12966<br>12995<br>13024   | 99208<br>99204<br>99200<br>99197<br>99193<br>99186<br>99186<br>99178<br>99177<br>99167<br>99163<br>99166<br>99152<br>99148  | 14320<br>14378<br>14477<br>14436<br>14464<br>14493<br>14522<br>14551<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752  | 98969<br>98965<br>98961<br>98957<br>98953<br>98948<br>98940<br>98931<br>98927<br>98923<br>98919<br>98914<br>98910<br>98906   | 16046<br>16074<br>16103<br>16132<br>16160<br>16189<br>16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.   | 98704<br>98700<br>98695<br>98695<br>98686<br>98681<br>98676<br>98671<br>98662<br>98652<br>98652<br>98648<br>98643<br>98638   | 46<br>45<br>44<br>43<br>42<br>41<br>40<br>39<br>38<br>37<br>36<br>35<br>34<br>33<br>92  |
| 14         9121         99583         10858           15         9150         99580         10887           16         9179         99578         10916           17         9208         99575         10943           18         9237         99572         10973           19         9266         99570         11002           20         9295         99567         11031           21         9324         99564         11060           22         9353         99520         11082           23         9382         99559         11116           24         9411         99553         1176           26         9469         99551         11263           27         9498         99548         11234           28         9527         99542         11291           30         9585         99540         11320           31         9614         99531         11463           32         9642         99534         11378           33         9671         99531         11463           35         9729         99528         11463   | 99409<br>99406<br>99402<br>99399<br>99396<br>99393<br>99386<br>99383<br>99380<br>99377<br>99374<br>99370<br>99367<br>99367<br>99357   | 12620<br>12649<br>12678<br>12706<br>12785<br>12764<br>12793<br>12822<br>12851<br>12908<br>12908<br>12937<br>12966<br>12995<br>13024   | 99200<br>99197<br>99193<br>99189<br>99186<br>99175<br>99175<br>99171<br>99167<br>99160<br>99156<br>99152<br>99148   | 14349<br>14878<br>14407<br>14436<br>14464<br>14493<br>14522<br>14551<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752  | 98965<br>98961<br>98957<br>98953<br>98948<br>98944<br>98936<br>98931<br>98927<br>98923<br>98919<br>98914<br>98910<br>98906   | 16074<br>16103<br>16132<br>16160<br>16189<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.   | 98700<br>98695<br>98696<br>98686<br>98681<br>98676<br>98671<br>98662<br>98652<br>98652<br>98654<br>98643<br>98638  | 45<br>44<br>48<br>42<br>41<br>40<br>39<br>38<br>37<br>36<br>35<br>34<br>33<br>92  |
| 15 9150 99580 10887 16 9179 99578 10916 17 9208 99575 10946 18 9237 99575 10978 19 9266 99570 11002 20 9295 99567 11031 21 9324 99564 11060 22 9353 99562 11082 23 9382 99559 11118 24 9411 99555 11176 25 9440 99553 11176 26 9469 99551 11295 27 9498 99548 11234 28 9527 99545 11291 30 9585 99542 11291 30 9585 99542 11291 30 9585 99542 11291 30 9585 99542 11291 31 9614 99587 11348 32 9642 99584 11378 32 9642 99584 11378 33 9671 99581 11407 34 9700 99528 11496 35 9729 99526 11465 36 9758 99523 11490 37 9787 99520 11528 38 9816 99517 11558 39 9845 99514 11580 40 9874 99511 11608 41 9903 99508 11638 42 9932 99506 11667 43 9961 99503 11696 44 9990 99500 11725 45 10019 99497 11754   | 99406<br>99402<br>99399<br>99396<br>99393<br>99386<br>99380<br>99377<br>99374<br>99370<br>99367<br>99367<br>99369   | 12649<br>12678<br>12706<br>12785<br>12764<br>12785<br>12822<br>12851<br>12880<br>12908<br>12937<br>12966<br>12995<br>13024  | 99197<br>99193<br>99186<br>99186<br>99175<br>99171<br>99167<br>99163<br>99166<br>99152<br>99148   | 14978<br>14407<br>14436<br>14464<br>14493<br>14522<br>14551<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752   | 98961<br>98957<br>98953<br>98948<br>98944<br>98936<br>98931<br>98927<br>98923<br>98919<br>98914<br>98910<br>98906  | 16103<br>16132<br>16160<br>16189<br>16218<br>16246<br>16275<br>16304<br>16393<br>16361<br>16890<br>16419<br>16447.   | 98695<br>98690<br>98686<br>98681<br>98676<br>98677<br>98667<br>98652<br>98652<br>98648<br>98643<br>98638   | 44<br>48<br>42<br>41<br>40<br>39<br>38<br>37<br>36<br>35<br>34<br>33<br>32<br>31  |
| 16         9179         99578         10916           17         9208         99575         10948           18         9237         99575         10973           19         9266         99570         11002           20         9295         99567         11031           21         9324         99564         11060           22         9353         99562         11089           23         9382         99559         11118           24         9411         99556         11176           25         9440         99551         11205           27         9498         99548         11201           28         9527         99545         11263           29         9556         99542         11291           30         9585         99540         11320           31         9614         99537         11343           32         9642         99584         11378           33         9671         99526         11465           36         9758         99523         11465           36         9758         99520         11523  | 99402<br>99399<br>99396<br>99393<br>99386<br>99386<br>99377<br>99374<br>99367<br>99367<br>99360   | 12678<br>12706<br>12785<br>12764<br>12793<br>12822<br>12851<br>12880<br>12908<br>12936<br>12995<br>13024<br>13053<br>13081  | 99193<br>99189<br>99186<br>99187<br>99175<br>99171<br>99163<br>99160<br>99156<br>99152<br>99148   | 14407<br>14436<br>14464<br>14493<br>14522<br>14551<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752  | 98957<br>98953<br>98948<br>98944<br>98940<br>98936<br>98931<br>98927<br>98923<br>98919<br>98914<br>98910<br>98906  | 16132<br>16160<br>16189<br>16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.  | 98690<br>98686<br>98681<br>98676<br>98671<br>98667<br>98662<br>98657<br>98652<br>98648<br>98643<br>98638   | 48<br>42<br>41<br>40<br>39<br>38<br>37<br>36<br>35<br>34<br>33<br>92  |
| 17         9208         99575         10945           18         9237         99572         10973           19         9266         99570         11002           20         9295         99567         11081           21         9324         99564         11060           22         9353         99562         11089           23         9382         99559         11118           25         9440         99553         11147           25         9440         99551         11205           27         9498         99548         11263           29         9557         99545         11263           29         9557         99545         11263           30         9585         99540         11320           31         9614         99537         11343           32         9642         99534         11378           33         9671         99531         11404           35         9729         99520         11453           36         9758         99523         11494           37         9787         99520         11523  | 99399<br>99396<br>99393<br>99386<br>99387<br>99377<br>99374<br>99370<br>99364<br>99360  | 12678<br>12706<br>12785<br>12764<br>12793<br>12822<br>12851<br>12880<br>12908<br>12936<br>12995<br>13024<br>13053<br>13081  | 99193<br>99189<br>99186<br>99187<br>99175<br>99171<br>99163<br>99160<br>99156<br>99152<br>99148   | 14436<br>14464<br>14493<br>14522<br>14551<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752   | 98953<br>98948<br>98944<br>98940<br>98936<br>98931<br>98923<br>98919<br>98914<br>98910<br>98906  | 16160<br>16189<br>16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.   | 98686<br>98681<br>98676<br>98671<br>98667<br>98662<br>98657<br>98652<br>98648<br>98643<br>98638  | 42<br>41<br>40<br>39<br>38<br>37<br>36<br>35<br>34<br>33<br>32<br>31  |
| 18         9237         99572         10973           19         9266         99570         11002           20         9295         99567         11031           21         9324         99562         11060           22         9353         99562         11082           23         982         99559         1117           25         9440         99553         1176           26         9469         99551         11263           27         9498         99548         11234           28         9527         99545         11263           29         9556         99542         11291           30         9585         99540         11320           31         9614         99537         11349           32         9642         99534         11378           33         9671         99531         11405           34         9700         99528         11465           35         9729         99526         11465           36         9758         99520         11523           38         9816         99517         11552   | 99396<br>99393<br>99390<br>99386<br>99383<br>99377<br>99374<br>99370<br>99364<br>99360<br>99357<br>99354  | 12706<br>12785<br>12764<br>12793<br>12822<br>12851<br>12880<br>12908<br>12907<br>12966<br>12995<br>13024  | 99189<br>99186<br>99178<br>99175<br>99171<br>99167<br>99163<br>99160<br>99156<br>99152<br>99148   | 14436<br>14464<br>14493<br>14522<br>14551<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752   | 98948<br>98944<br>98940<br>98936<br>98931<br>98927<br>98923<br>98919<br>98914<br>98910   | 16160<br>16189<br>16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.   | 98686<br>98681<br>98676<br>98671<br>98667<br>98662<br>98657<br>98652<br>98648<br>98643<br>98638  | 40<br>39<br>38<br>37<br>36<br>35<br>34<br>33<br>32  |
| 19   9266   99570   11002  | 99393<br>99390<br>99386<br>99383<br>99377<br>99374<br>99370<br>99367<br>99364<br>99360  | 12785<br>12764<br>12793<br>12822<br>12851<br>12880<br>12908<br>12937<br>12966<br>12995<br>13024   | 99186<br>99182<br>99178<br>99175<br>99171<br>99167<br>99163<br>99160<br>99156<br>99152<br>99148   | 14493<br>14522<br>14551<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752   | 98944<br>98940<br>98936<br>98931<br>98927<br>98923<br>98919<br>98914<br>98910<br>98906   | 16189<br>16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447,<br>16476   | 98681<br>98676<br>98671<br>98667<br>98662<br>98657<br>98652<br>98648<br>98643<br>98638<br>98638  | 40<br>39<br>38<br>37<br>36<br>35<br>34<br>33<br>32  |
| 20   | 99390<br>99386<br>99383<br>99380<br>99377<br>99374<br>99370<br>99367<br>99364<br>99360  | 12764<br>12793<br>12822<br>12851<br>12880<br>12908<br>12937<br>12966<br>12995<br>13024  | 99182<br>99178<br>99175<br>99171<br>99167<br>99163<br>99160<br>99156<br>99152<br>99148  | 14493<br>14522<br>14551<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752   | 98940<br>98936<br>98931<br>98927<br>98923<br>98919<br>98914<br>98910<br>98906  | 16218<br>16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447,<br>16476  | 98676<br>98671<br>98667<br>98662<br>98657<br>98652<br>98648<br>98643<br>98638<br>98638   | 39<br>38<br>37<br>36<br>35<br>34<br>33<br>32<br>31  |
| 21   9324   99564   11060  | 99386<br>99383<br>99380<br>99377<br>99374<br>99367<br>99364<br>99360  | 12793<br>12822<br>12851<br>12880<br>12908<br>12937<br>12966<br>12995<br>13024   | 99178<br>99175<br>99171<br>99167<br>99163<br>99160<br>99156<br>99152<br>99148   | 14522<br>14551<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752  | 98940<br>98936<br>98931<br>98927<br>98923<br>98919<br>98914<br>98910<br>98906  | 16246<br>16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.<br>16476   | 98671<br>98667<br>98662<br>98657<br>98652<br>98648<br>98643<br>98638   | 39<br>38<br>37<br>36<br>35<br>34<br>33<br>32<br>31  |
| 22         9353         99562         11089           23         9382         99559         11118           24         9411         99556         11176           25         9440         99551         11205           26         9469         99551         11205           27         9498         99548         11226           28         9527         99545         11263           29         9556         99542         11221           30         9585         99540         11320           31         9614         99537         11343           32         9642         99584         11378           33         9671         99528         11436           35         9729         99528         11465           36         9758         99523         11494           37         9787         99520         11526           38         9816         99517         11580           40         9874         99511         11608           41         9903         99508         11638           42         9932         99506         11667  | 99383<br>99380<br>99377<br>99374<br>99370<br>99367<br>99360<br>99357<br>99354   | 12822<br>12851<br>12880<br>12908<br>12937<br>12966<br>12995<br>13024  | 99175<br>99171<br>99167<br>99163<br>99160<br>99156<br>99152<br>99148  | 14551<br>14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752   | 98936<br>98931<br>98927<br>98923<br>98919<br>98914<br>98910<br>98906   | 16275<br>16304<br>16333<br>16361<br>16390<br>16419<br>16447.<br>16476  | 98667<br>98662<br>98657<br>98652<br>98648<br>98643<br>98638  | 38<br>37<br>36<br>35<br>34<br>33<br>32<br>31  |
| 23 9382 99559 11118 24 9411 99555 11147 25 9440 99553 11176 26 9469 99551 11205 27 9498 99548 11234 28 9527 99545 11263 29 9556 99542 11291 30 9585 99540 11323 31 9614 99537 11343 32 9642 99534 11378 33 9671 99531 11407 34 9700 99528 11436 35 9729 99526 11465 36 9758 99520 11323 38 9816 99570 11523 38 9816 99511 11552 39 9845 99514 11560 40 9874 99517 11552 40 9874 99511 11603 41 9903 99508 11638 42 9932 99506 11663 43 9961 99503 11638 44 9990 99500 11725 45 10019 99497 11754   | 99380<br>99377<br>99374<br>99370<br>99367<br>99364<br>99360   | 12851<br>12880<br>12908<br>12937<br>12966<br>12995<br>13024   | 99171<br>99167<br>99163<br>99160<br>99156<br>99152<br>99148   | 14580<br>14608<br>14637<br>14666<br>14695<br>14723<br>14752  | 98931<br>98927<br>98923<br>98919<br>98914<br>98910<br>98906  | 16304<br>16333<br>16361<br>16390<br>16419<br>16447.<br>16476   | 98662<br>98657<br>98652<br>98648<br>98643<br>98638<br>98633  | 37<br>36<br>35<br>34<br>33<br>32  |
| 24         9411         99555         11147           25         9440         99553         11176           26         9469         99551         11205           27         9498         99545         11263           28         9527         99545         11263           29         9556         99542         11291           30         9585         99540         11320           31         9614         99537         11349           32         9642         99534         11378           33         9671         99531         11407           34         9700         99528         11465           35         9729         99526         11465           36         9758         99523         11493           37         9787         99520         11523           38         9816         99514         11580           40         9874         99514         11580           40         9874         99511         11603           41         9903         99506         11638           42         9932         99506         11663  | 99377<br>99374<br>99370<br>99367<br>99364<br>99360<br>99357<br>99354  | 12880<br>12908<br>12937<br>12966<br>12995<br>13024<br>13053<br>13081  | 99167<br>99163<br>99160<br>99156<br>99152<br>99148  | 14608<br>14637<br>14666<br>14695<br>14723<br>14752   | 98927<br>98923<br>98919<br>98914<br>98910<br>98906   | 16333<br>16361<br>16390<br>16419<br>16447.<br>16476  | 98657<br>98652<br>98648<br>98643<br>98638<br>98633   | 36<br>35<br>34<br>33<br>33<br>31  |
| 25 9440 99553 11176 26 9469 99551 11205 27 9498 99548 11234 28 9527 99545 11263 29 9556 99542 11291 30 9585 99540 11320 31 9614 99587 11349 32 9642 99584 11378 33 9671 99531 11407 34 9700 99528 11436 35 9729 99526 11465 36 9758 99523 11494 37 9787 99520 11523 38 9816 99517 11552 39 9845 99514 11580 40 9874 99511 11603 41 9903 99508 11638 42 9932 99506 11663 43 9961 99503 11696 44 9990 99500 11725 45 10019 99497 11754   | 99374<br>99370<br>99367<br>99364<br>99360<br>99357<br>99354   | 12908<br>12937<br>12966<br>12995<br>13024<br>13053<br>13081   | 99163<br>99160<br>99156<br>99152<br>99148<br>99144  | 14637<br>14666<br>14695<br>14723<br>14752  | 98923<br>98919<br>98914<br>98910<br>98906  | 16361<br>16390<br>16419<br>16447.<br>16476   | 98652<br>98648<br>98643<br>98638<br>98633  | 35<br>34<br>33<br>32<br>31  |
| 26 9469 99551 11905 27 9498 99548 11234 28 9527 99545 11263 29 9556 99542 11291 30 9585 99540 113203 31 9614 99537 11343 32 9642 99534 11378 33 9671 99531 11407 34 9700 99528 11436 35 9729 99526 11465 36 9758 99523 11494 37 9787 99520 11552 38 9816 99517 11552 39 9845 99511 11608 40 9874 99511 11608 41 9903 99508 11638 42 9932 99506 11667 43 9961 99503 11696 44 9990 99500 11725 45 10019 99497 11754  | 99370<br>99367<br>99364<br>99360<br>99357<br>99354  | 12937<br>12966<br>12995<br>13024<br>13053<br>13081  | 99160<br>99156<br>99152<br>99148<br>99144   | 14666<br>14695<br>14723<br>14752   | 98919<br>98914<br>98910<br>98906   | 16390<br>16419<br>16447.<br>16476  | 98648<br>98643<br>98638<br>98633   | 34<br>33<br>32<br>31  |
| 27         9498         99548         11234           28         9527         99545         11263           29         9556         99542         11291           30         9585         99540         11320           31         9614         99537         11348           32         9642         99534         11378           33         9671         99528         11496           34         9700         99528         11494           35         9729         99526         11463           36         9758         99523         11494           37         9787         99520         11523           38         9816         99517         11552           39         9845         99514         11580           40         9874         99511         11603           41         9903         99506         11638           42         9932         99506         11660           43         9961         99503         11690           44         9990         99500         11725           45         10019         99497         11754   | 99367<br>99364<br>99360<br>99357<br>99354   | 12966<br>12995<br>13024<br>13053<br>13081   | 99156<br>99152<br>99148<br>99144  | 14695<br>14723<br>14752  | 98914<br>98910<br>98906  | 16419<br>16447.<br>16476   | 98643<br>98638<br>98633  | 33<br>32<br>31  |
| 28 9527 99545 11263 29 9556 99542 11291 30 9585 99540 11320 31 9614 99537 11349 32 9642 99534 11378 33 9671 99531 11407 34 9700 99528 11445 35 9729 99526 11465 36 9758 99523 11494 37 9787 99520 11523 38 9816 99517 11552 39 9845 99514 11580 40 9874 99511 11603 41 9903 99508 11638 42 9932 99506 11638 42 9932 99506 11638 43 9961 99503 11696 44 9990 99500 11725 45 10019 99497 11754   | 99364<br>99360<br>99357<br>99354  | 12995<br>13024<br>13053<br>13081  | 99152<br>99148<br>99144   | 14723<br>14752   | 98910<br>98906   | 16447.<br>16476  | 98638<br>98633   | · 32<br>31  |
| 29   9556   99542   11291<br>  30   9585   99540   11320<br>  31   9614   99537   11349<br>  32   9642   99534   11378<br>  33   9671   99531   11407<br>  34   9700   99528   11436<br>  35   9729   99526   11465<br>  36   9758   99529   11493<br>  37   9787   99520   11523<br>  38   9816   99517   11552<br>  39   9845   99514   11580<br>  40   9874   99514   11580<br>  41   9903   99508   11638<br>  42   9932   99506   11667<br>  43   9961   99500   11725<br>  45   10019   99497   11754  | 99360<br>99357<br>99354   | 13024<br>13053<br>13081   | 99148<br>99144  | 14752  | 98906  | 16476  | 98633  | S1  |
| 30 9585 99540 11320<br>31 9614 99537 11343<br>32 9642 99534 11378<br>33 9671 99531 11407<br>34 9700 99528 11436<br>35 9729 99526 11465<br>36 9758 99523 11494<br>37 9787 99520 11552<br>38 9816 99517 11552<br>39 9845 99514 11580<br>40 9874 99511 11608<br>41 9903 99508 11638<br>42 9932 99506 11667<br>43 9961 99503 11696<br>44 9990 99500 11725<br>45 10019 99497 11754  | 99357<br>99354  | 13053<br>13081  | 99144   |  |  | <del></del>  |  |   |
| 31         9614         99587         11349           32         9642         99584         11378           33         9671         99531         11407           34         9700         99528         11465           35         9729         99526         11465           36         9758         99523         11494           37         9787         99520         11523           38         9816         99511         11550           39         9845         99514         11580           40         9874         99511         11603           41         9903         99508         11638           42         9932         99506         11663           43         9961         99503         11696           44         9990         99500         11725           45         10019         99497         11754   | 99354   | 13081   |   | 14781  | 98902  | 16505  | 98629  | 30  |
| 31         9614         99587         11349           32         9642         99584         11378           33         9671         99531         11407           34         9700         99528         11465           35         9729         99526         11465           36         9758         99523         11494           37         9787         99520         11523           38         9816         99511         11550           39         9845         99514         11580           40         9874         99511         11603           41         9903         99508         11638           42         9932         99506         11663           43         9961         99503         11696           44         9990         99500         11725           45         10019         99497         11754   | 99354   | 13081   |   |  |  |  |  |   |
| 32   9642   99584   11378<br>  33   9671   99531   11407<br>  34   9700   99528   11436<br>  35   9729   99526   11465<br>  36   9758   99523   11494<br>  37   9787   99520   11525<br>  38   9816   99517   11552<br>  39   9845   99514   11580<br>  40   9874   99511   11608<br>  41   9903   99508   11638<br>  42   9932   99506   11668<br>  43   9961   99503   11696<br>  44   9990   99500   11725<br>  45   10019   99497   11754  |   |   | 99141   | 14810  | 98897  | 16533  | 98624  | 29  |
| 33   9671   99531   11407     34   9700   99528   11496     35   9729   99526   11465     36   9758   99523   11494     37   9787   99520   11523     38   9816   99517   11552     39   9845   99514   11580     40   9874   99511   11603     41   9903   99508   11638     42   9932   99506   116638     43   9961   99503   11696     44   9990   99500   11725     45   10019   99497   11754     34   9961   99503   11696     45   10019   99497   11754     46   10019   99497   11754     36   10019   99497   11754     36   10019   99497   11754     37   10019   99497   11754     36   11407   11407   11407     37   11407   11407   11407     38   98   11497   11407     49   9900   99500   11725     49   99497   11754     40   99500   99497   11754     41   9900   99497   11754     42   9930   99500   11725     43   9961   99500   11725     44   9990   99500   11725     45   10019   99497   11754     46   9758   9758   11494     47   9788   9788   11494     48   9788   9788   11494     49   9788   9788   11494     40   9874   9950   99500     41   9960   99500   11725     42   9980   99500   11725     43   9961   99500   11725     44   9990   99500   11725     45   10019   99497   11754  | 22.25(3.3)  | 13110   | 99137   | 14838  | 98893  | 16562  | 98619  | 28  |
| 34   9700   99528   11436<br>  35   9729   99526   11456<br>  36   9758   99523   11494<br>  37   9787   99520   11523<br>  38   9816   99517   11552<br>  39   9845   99514   11580<br>  40   9874   99511   11609<br>  41   9903   99508   11638<br>  42   9932   99506   116638<br>  43   9961   99503   11696<br>  44   9990   99500   11725<br>  45   10019   99497   11754   |   | 13139   | 99133   | 14867  | 98889  | 16591  | 98614  | 27  |
| 35 9729 99526 11465<br>36 9758 99523 11494<br>37 9787 99520 11523<br>38 9816 99517 11552<br>39 9845 99514 11580<br>40 9874 99511 11608<br>41 9903 99508 11638<br>42 9932 99506 11667<br>43 9961 99503 11696<br>44 9990 99500 11725<br>45 10019 99497 11754   |   | 13168.  | 99129   | 14896  | 98884  | 16620  | 98609  | 26  |
| 36 9758 99523 11494<br>37 9787 99520 11552<br>38 9816 99517 11552<br>39 9845 99511 11603<br>40 9874 99511 11603<br>41 9903 99508 11638<br>42 9932 99506 11663<br>43 9961 99503 11696<br>44 9990 99500 11725<br>45 10019 99497 11754  |   | 13197   | 99125   | 14925  | 98880  | 16648  | 98604  | 25  |
| 37   9787   99520   11523<br>  38   9816   99517   11552<br>  39   9845   99514   11580<br>  40   9874   99511   11609<br>  41   9903   99508   11638<br>  42   9932   99506   11663<br>  43   9961   99503   11696<br>  44   9990   99500   11725<br>  45   10019   99497   11754   |   | 13226   | 99122   | 14954  | 98876  | 16677  | 98600  | 24  |
| 38 9816 99517 11552<br>39 9845 99514 11580<br>40 9874 99511 11609<br>41 9903 99508 11638<br>42 9932 99506 11667<br>43 9961 99503 11690<br>44 9990 99500 11725<br>45 10019 99497 11754  |   | 13254   | 99118   | 14982  | 98871  | 16706  | 98595  | 23  |
| 39   9845   99514   11580<br>  40   9874   99511   11609<br>  41   9903   99508   11638<br>  42   9932   99506   11667<br>  43   9961   99503   11696<br>  44   9990   99500   11725<br>  45   10019   99497   11754   |   | 13283   | 99114   | 15011  | 98867  | 16734  | 93590  | 22  |
| 40 9874 99511 11609<br>41 9903 99508 11638<br>42 9932 99506 11667<br>43 9961 99503 11696<br>44 9990 99500 11725<br>45 10019 99497 11754  |   | 13312   | 99110   | 15040  | 98863  | 16763  | 98585  | 21  |
| 41.   9903   99508   11638<br>  42   9932   99506   11667<br>  43   9961   99503   11696<br>  44   9990   99500   11725<br>  45   10019   99497   11754  | -   | 10041   | 00100   | 15069  | 98858  | 10700  | 00500  | 20  |
| 42 9932 99506 11667<br>43 9961 99503 11696<br>44 9990 99500 11725<br>45 10019 99497 11754  |   | 19341   | 99106   | 15009  | 98854  | 16792<br>16820   | 98580  | 19  |
| 43 9961 99503 11696<br>44 9990 99500 11725<br>45 10019 99497 11754   |   | 13370   | 99102   | 15126  | 98849  |  | 98575  | 18  |
| 44 9990 99500 11725<br>45 10019 99497 11754  | 99317   | 13399   | 99098   |  | 98845  | 16849  | 98570  | -17   |
| 45 10019 99497 11754   |   | 13427   | 99094   | 15155<br>15184   | 98841  | 16878<br>16906   | 98565<br>98561   | 16  |
|  |   | 13456   | 99091   | 15212  | 98836  | 16935  | 98556  | 15  |
|  |   | 13485   | 99087   | 15212  | 98832  | 16964  | 98551  | 13  |
| 46   10048   99494   11789<br>  47   10077   99491   11819   |   | 13514<br>13543  | 99065   | 15270  | 98827  | 16992  | 98546  | 13  |
|  |   |   |   | 15299  | 98823  | 17021  | 98541  | 12  |
| 48 10106 99488 11840   |   | 18572.  | 99075   | 15327  | 98818  | 17050  | 98536  | 11  |
| 49 10135 99485 11869   | 99293   | 13600   | 99071   | 10021  |  | 17000  |  |   |
| 50, 10164 99482 11898  | 99290   | 13629   | 99067   | 15356  | 98814  | 17078  | 98531  | . 10  |
| 51   10192   99479   11927   |   | 13 <b>65</b> 8  | 99063   | 15385.   | 98809  | 17107  | 98526  | 9   |
| 52   10221   99476   11956   |   | 13687   | 99059   | 15414  | 98805  | 17136  | 98521  | 8   |
| 53 10250 99473 11985   |   | 18716   | 99055   | 15442  | 98800  | 17164  | 98516  | 7   |
| <b>54</b>   10279   99470   12014  |   | 13744   | 99051   | 15471.   | 98796  | 17193  | 98511  | 6   |
| 55 10308 99467 12043   |   | 13773   | 99047   | 15500  | 98791  | 17222  | 98506  | 5   |
| 56   10337   99464   12071   |   | 13802   | 99043   | 15529  | 98787  | 17250  | 98501  | 4   |
| 57   10366   99461   12100   |   | 13851   | 99039   | 15557  | 98782  | 17279  | 98496  | 8   |
| 58   10 <b>3</b> 95   99458   12129  |   | 13860   | 99035   | 15586  | 98778  | 17308  | 98491  | 2   |
| 59   10424   99455   12158   |   | 13889   | 99031   | 15615  | 98773  | 17896  | 98486  | 1   |
| 60 10453 99452 12187   |   | 13917   | 99027   | 15643  | 98769  | 17365  | 98481  | 0   |
|  |   | ļ   | N. sine.  | NT   | 27   |  | N. sine.   | Min   |
| N. cos. N. sine. N. cos  | M sine  |   |   |  |  | N con  |  |   |
| 84°  | N. sine   |   | 20  |  | N. sine.<br>10   | N. cos.  | 00<br>00   | 242322  |

| 0         17365         98481         19081         98163           1         17393         98475         19109         98157           2         17422         98471         19188         98152           3         17451         984661         19167         98146           4         17479         98461         19195         98140           5         17508         98455         19224         98135           6         17537         98450         19252         98129           7         17565         98440         19309         98118           9         17623         98490         19366         98107           11         17680         98425         19395         98101           12         17708         98420         19423         98096           13         17737         98414         19452         98090           14         17766         98409         19481         98046           15         17794         98404         19509         98073           17         17852         98394         19566         98073           17         17953         9837         1   |                | 20             | 13             | ) -                     |                |                        |           |
|--|----------------|----------------|----------------|-------------------------|----------------|------------------------|-----------|
| 0         17365         98481         19081         98163           1         17593         98476         19109         98157           2         17422         98471         19138         98152           3         17451         98461         19167         98146           4         17479         98461         19195         98140           5         17508         98455         19224         98135           6         17537         98450         19252         98129           7         17565         98445         19399         98118           9         17623         98490         19366         98107           11         17680         98425         19395         98101           12         17708         98420         19423         98096           13         17737         98414         19452         98090           14         17766         98409         19481         98061           15         17794         98404         19509         98073           17         17852         98394         19566         98071           18         17806         98373         1   | N. sine.       | N. cos.        | N. sine.       |                         | N. sine.       | 10                     |           |
| 1         17993         98475         19109         98157           2         17422         98471         19138         98152           3         17451         98466         19167         98146           4         17479         98461         19195         98140           5         17508         98455         19224         98135           6         17537         98450         19522         98129           7         17565         98440         19309         98118           9         17623         98430         19366         98107           11         17680         98425         19395         98101           12         17708         98420         19423         98096           13         17737         98414         19452         98090           14         17766         98409         19481         9804           15         17794         98404         19509         98073           17         17823         98399         19566         98073           17         17860         98373         19680         98074           18         1780         98381         19   |                |                |                |                         |                | N. cos.                |           |
| 2         17422         98471         19188         98152           3         17451         98466         19167         98146           4         17479         98461         19195         98146           5         17508         98455         19924         98155           6         17537         98450         19252         98129           7         17565         98445         19281         98129           8         17594         98440         19309         98118           9         17680         98490         19366         98107           11         17680         98425         19395         98101           12         17708         98420         19423         9806           13         17737         98414         19452         9809           14         17766         98409         19481         98061           15         17794         98404         19569         98073           16         17823         98399         19538         98073           17         17852         98394         19566         98067           18         17800         98883         19   | 20791<br>20820 | 97815<br>97809 | 22495<br>22523 | 97437                   | 24192          | 97030                  | . 60      |
| 3         17451         98466         19167         98146           4         17479         98461         19195         98146           5         17508         98455         19924         98135           6         17537         98450         19252         98129           7         17565         98445         19281         98124           8         17594         98440         19309         98118           9         17623         98490         19366         98107           11         17680         98425         19395         98101           12         17708         98420         19423         98096           13         17737         98414         19452         98090           14         17766         98409         19481         98061           15         17794         98404         19509         98073           16         17823         98394         19566         98067           18         17880         98589         19595         98061           19         17993         98878         19623         98056           21         17955         98373 <td< td=""><td>20848</td><td>97803</td><td>22552</td><td>97430<br/>97424</td><td>24220<br/>24249</td><td>97023<br/>9701<i>5</i></td><td>59<br/>58</td></td<>  | 20848          | 97803          | 22552          | 97430<br>97424          | 24220<br>24249 | 97023<br>9701 <i>5</i> | 59<br>58  |
| 5         17508         98455         19224         98155           6         17537         98450         19252         98129           7         17565         98440         19309         98118           8         17594         98440         19309         98118           9         17623         98430         19366         98107           11         17680         98425         19395         98101           12         17708         98420         19423         98096           13         17737         98414         19452         98090           14         17766         98409         19481         98084           15         17794         98404         19509         98073           17         17852         98394         19566         98073           17         17860         98373         19589         98073           17         17860         98373         19680         98041           19         17909         9838         19623         98050           20         17937         9878         19652         98050           21         17966         98373 <td< td=""><td>20877</td><td>97797</td><td>22580</td><td>97417</td><td>24277</td><td>97008</td><td>57</td></td<>  | 20877          | 97797          | 22580          | 97417                   | 24277          | 97008                  | 57        |
| 6         17587         98450         19252         98129           7         17565         98445         19309         98118           8         17594         98440         19309         98118           9         17623         98435         19398         98112           10         17661         98490         19366         98107           11         17680         98425         19395         98101           12         17708         98420         19423         98096           13         17757         98414         19452         98090           14         17766         98409         19481         98064           15         17794         98404         19509         98079           16         17823         98394         19566         98071           17         17852         98394         19566         98071           18         17890         98838         19623         98061           19         17909         98833         19623         98050           20         17937         98378         19623         98030           21         17966         98373  | 20905          | <b>977</b> 91  | 22608          | 97411.                  | 24305          | 97001                  | 56        |
| 7         17565         98445         19281         98124           8         17594         98440         19309         98118           9         17623         98435         19388         98112           10         17651         98430         19366         98107           11         17680         98425         19395         98101           12         17708         98420         19423         98096           13         17737         98414         19452         98090           14         17766         98409         19481         98061           15         17794         98404         19509         98073           16         17823         98399         19558         98073           17         17852         98391         19566         98067           18         17880         98589         19595         98061           19         17909         98831         19623         98056           20         17937         98378         19623         98056           21         17965         98371         19680         98044           22         17935         98368   | 20933          | 97784          | 22637          | 97404                   | 24333          | 96994                  | 55        |
| 8         17594         98440         19309         98118           9         17623         98495         19388         98112           10         17651         98490         19366         98107           11         17680         98425         19395         98101           12         17708         98420         19423         98096           13         17776         98409         19481         98084           15         17794         98404         19509         98073           16         17823         98399         19558         98073           17         17852         98394         19566         98067           18         17880         98881         19555         98061           19         17909         98383         19623         98056           20         17937         98378         19652         98050           21         17966         98373         19660         98047           22         17955         98368         19709         98039           23         18052         98357         19766         98027           25         18061         98357  | 20962<br>20990 | 97778          | 22665          | 97398                   | 24362          | 96987                  | 54        |
| 9 17623 98495 19388 98112 10 17651 98490 19366 98107 11 17680 98425 19395 98101 12 17708 98420 19423 98096 13 17737 98414 19452 98090 14 17766 98409 19481 98084 15 17794 98404 19509 98079 16 17823 98399 19588 98073 17 17852 98394 19566 98067 18 17890 98383 19523 98056 19 17909 98383 19623 98056 19 17909 98383 19623 98056 19 17909 98383 19623 98056 20 17937 98378 19652 98050 21 17966 98373 19680 98044 22 17995 98368 19709 98039 23 18023 98362 19737 98033 24 18052 98357 19766 98027 25 18061 98352 19794 98021 26 18109 98347 19823 98016 27 18138 98341 19851 98010 28 18166 98336 19880 98004 29 18195 98381 19908 97998 30 18224 98325 19937 97992 31 18252 98320 19965 97987 32 18281 98315 19994 97981 33 18309 98310 20022 97975 34 18398 98304 20051 97969 35 18367 98299 20079 97963 36 18395 98294 20108 97958 37 18424 98288 20136 97952 38 18452 98283 20165 97946 39 18481 98277 20193 97940 40 18509 98272 20222 97934 41 18538 98267 20250 97928 43 18595 98294 20108 97955 36 18661 98245 20336 97916 44 18624 98285 20336 97916 45 18652 98245 20336 97916 46 18681 98240 20339 97899 47 18710 98234 20421 97893 48 18738 98292 20450 97887 50 18795 98218 20356 97867 51 18844 98212 20535 97860 52 18852 98207 20450 97887 55 18881 98201 20592 97857 51 18881 98201 20592 97857 55 18881 98201 20592 97857 55 18881 98201 20599 97855 53 18881 98201 20599 97855 54 18967 98281 20507 97875 55 18881 98201 20599 97857 55 18881 98201 20599 97857 55 18881 98201 20599 97857 55 18881 98201 20599 97857 55 18881 98201 20599 97857 55 18881 98201 20599 97857 55 18881 98201 20599 97857 55 18967 98185 20677 97859 56 18967 98185 20677 97859 | 21019          | 97772<br>97766 | 22693<br>22722 | 97391<br>97384          | 24390<br>24418 | 96980                  | 53<br>52  |
| 11         17680         98425         19395         98101           12         17708         98420         19423         98096           13         17737         98414         19452         98090           14         17766         98409         19481         98084           15         17794         98404         19509         98079           16         17823         98394         19566         98067           17         17852         98394         19566         98061           19         17909         98383         19623         98056           19         17999         98383         19623         98056           20         17937         98378         19620         98041           21         17966         98373         19680         98042           22         17955         98368         19709         98039           23         18023         98362         19737         98033           24         18052         98357         19766         98027           25         18061         98357         19766         98027           25         18061         98357  | 21047          | 97760          | 22750          | 97378                   | 24446          | 96973<br>96966         | 51        |
| 11         17680         98425         19395         98101           12         17708         98420         19423         98096           13         17737         98414         19452         98090           14         17766         98409         19481         98084           15         17794         98404         19509         98079           16         17823         98394         19566         98067           17         17852         98394         19566         98061           19         17909         98383         19623         98056           19         17999         98383         19623         98056           20         17937         98378         19620         98041           21         17966         98373         19680         98042           22         17955         98368         19709         98039           23         18023         98362         19737         98033           24         18052         98357         19766         98027           25         18061         98357         19766         98027           25         18061         98357  | 21076          | 97754          | 22778          | 97371                   | 24474          |                        |           |
| 13         17737         98414         19452         98090           14         17766         98409         19481         98084           15         17794         98404         19509         98073           17         17852         98399         19558         98073           17         17852         98394         19566         98067           18         17880         98883         19623         98056           19         17909         98883         19623         98056           20         17937         98378         19623         98056           21         17966         98373         19680         98044           22         17995         98368         19709         98039           23         18023         98362         19737         98033           24         18052         98357         19769         98029           25         18081         98352         19737         98033           24         18052         98357         19769         98021           25         18166         98336         19823         98046           27         18138         98341  | 21104          | 97748          | 22801          | 97365                   | 24503          | 96959<br>96952         | 50<br>49  |
| 14         17766         98409         19481         98084           15         17794         98404         19509         98073           16         17823         98399         19558         98073           17852         98394         19566         98067           18         17800         98383         19623         98056           19         17909         98383         19623         98056           20         17937         98378         19620         98044           22         17995         98368         19709         98039           23         18023         98362         19737         98033           24         18052         98357         19766         98027           25         18061         98352         19794         98021           26         18109         98341         19823         98016           27         18138         98361         1980         98042           28         18166         98336         1980         9804           29         18195         9831         19908         97998           30         18224         98325         19937   | 21132          | 97742          | 22835          | 97358                   | 24531          | 96945                  | 48        |
| 15         17794         98404         19509         98079           16         17823         98399         19588         98073           17         17852         98394         19566         98067           18         17880         98389         19595         98061           19         17909         98838         19623         98056           20         17937         98378         19680         98044           21         17966         98373         19680         98044           22         17995         98368         19709         98033           24         18052         98362         19797         98033           24         18052         98357         19766         98027           25         18061         98357         19766         98027           25         18169         98347         19823         98016           27         18138         98341         19823         98016           28         18166         98336         19809         97998           30         18224         98325         19937         97992           31         18359         98394  | 21161          | 97735          | 22863          | 97351                   | <b>2455</b> 9  | 96937                  | 47        |
| 16         17823         98399         19538         98073           17         17852         98394         19566         98067           18         17880         98389         19595         98061           19         17909         98383         19623         98056           20         17937         98378         19652         98056           21         17966         98373         19680         98044           22         17995         98368         19709         98039           23         18052         98357         19766         98027           25         18061         98357         19766         98027           25         18061         98357         19766         98027           26         18109         98347         19823         9804           27         18138         98341         19851         9801           28         18166         98336         1980         9800           29         18195         9831         19908         97998           30         18224         98325         19937         97992           31         18359         98310         <   | 21189<br>21218 | 97729          | 22892          | 97348                   | 24587          | 96930                  | 46        |
| 17         17852         98394         19566         98967           18         17880         98389         19555         98061           19         17909         98883         19623         98056           20         17937         98378         19623         98056           21         17966         98373         19680         98044           22         17995         98368         19709         98039           23         18023         98362         19737         98033           24         18052         98357         19766         98027           25         18081         98352         19794         98021           26         18109         98347         19823         98016           27         18138         98341         19851         98010           28         18166         98336         1980         97998           30         18224         98325         19937         97992           31         18252         98320         19965         97987           32         18281         98315         19994         97981           33         18309         98310   | 21246          | 97723<br>97717 | 22920<br>22948 | 97838<br>97831          | 24615<br>24644 | 96923                  | 45        |
| 19         17909         98883         19623         98056           20         17937         98378         19652         98050           21         17966         98373         19680         98044           22         17995         98368         19709         98039           23         18023         98362         19737         98033           24         18052         98357         19766         98027           25         18081         98352         19794         98021           26         18109         98347         19823         98016           27         18138         98341         19851         98004           29         18195         98381         1980         98004           29         18195         98361         1980         9806           29         18195         98361         1980         9804           29         18195         98361         1998         97998           30         18224         98325         19937         97992           31         18252         98310         20022         97975           32         18281         98315 <t< td=""><td>21275</td><td>97711</td><td>22977</td><td>97325</td><td>24672</td><td>96916<br/>96909</td><td>44</td></t<>   | 21275          | 97711          | 22977          | 97325                   | 24672          | 96916<br>96909         | 44        |
| 20         17937         98378         19652         98050           21         17966         98373         19680         98044           22         17995         98368         19709         98039           23         18023         98362         19737         98033           24         18052         98357         19766         98027           25         18061         98352         19794         98021           26         18109         98347         19823         98046           27         18138         98341         19851         98004           29         18195         98336         1980         98004           29         18195         98361         1980         98004           29         18195         98361         1980         97998           30         18224         98325         19937         97992           31         18352         98360         19965         97987           32         18281         98315         19994         97981           33         18309         98310         20022         97975           34         18338         98304   | 21303          | 97705          | 230Q5          | -97318                  | 24700          | 96902                  | 42        |
| 21         17966         98373         19680         98044           22         17995         98368         19709         98039           23         18023         98362         19737         98033           24         18052         98357         19766         98027           25         18081         98357         19794         98021           26         18109         98347         19823         98016           27         18188         98341         19851         98004           28         18166         98336         19880         98042           29         18195         98331         19908         97998           30         18224         98325         19937         97992           31         18252         98320         19965         97987           32         18281         98315         19994         97981           33         18309         98310         20022         97975           34         18338         98304         20051         97963           35         18367         98299         20079         97963           36         18395         982829   | 21331          | 97698          | 23033          | 97311                   | 24728          | 96894                  | 41        |
| 22         17995         98368         19709         98039           23         18023         98362         19737         98033           24         18052         98357         19766         98027           25         18061         98357         19769         98021           26         18109         98347         19823         98016           27         18138         98341         19851         98010           28         18166         98336         1980         98004           29         18195         98331         19908         97998           30         18224         98325         19937         97992           31         18252         98320         19965         97987           32         18281         98315         19994         97981           33         18309         98310         20022         97975           34         18398         98304         20051         97969           35         18367         98299         20079         97963           36         18395         98284         20108         97958           37         18424         98283   | 21360          | 97692          | 23062          | 97304                   | 24756          | 96887                  | 40        |
| 23         18023         98362         19737         98033           24         18052         98357         19766         98027           25         18081         98352         19794         98021           26         18109         98347         19823         98016           27         18138         98341         19851         98010           28         18166         98336         1980         98004           29         18195         9831         19908         97998           30         18252         98320         19965         97987           31         18252         98320         19965         97987           32         18391         98315         19994         97981           33         18309         98310         20022         97975           34         18338         98304         20051         97969           35         18367         98299         20079         97963           36         18424         98288         20136         97958           37         18424         98288         20136         97958           38         18452         98288  | 21388          | 97686          | 23090          | 97298                   | 24784          | 96880                  | 39        |
| 24         18052         98357         19766         98027           25         18061         98352         19794         98021           26         18109         98347         19823         98016           27         18138         98341         19851         98010           28         18166         98336         19800         98004           29         18195         98381         19908         97998           30         18224         98325         19937         97992           31         18329         98320         19965         97987           32         18381         98315         19994         97981           33         18309         98310         20022         97975           34         18398         98304         20051         97969           35         18367         98299         20079         97963           36         18395         98294         20108         97958           37         18424         98283         20165         97946           39         18481         98272         20222         97934           41         18509         98272  | 21417          | 97680          | 23118          | 97291                   | 24813          | 96873                  | 38        |
| 25         18081         98352         19794         98021           26         18109         98347         19823         98046           27         18138         98341         19851         98004           28         18166         98336         19880         98004           29         18195         98331         19908         97998           30         18224         98325         19937         97992           31         18252         98320         19965         97987           32         18281         98315         19994         97981           33         18809         98310         20022         97975           34         18338         98304         20051         97969           35         18367         98299         20079         97963           36         18395         98294         20108         97958           37         18424         98288         20136         97958           38         18452         98283         20165         97946           39         18481         98272         20222         97934           40         18509         98272  | 21445          | 97673          | 23146          | 97284                   | 24841          | 96866                  | 37        |
| 26         18109         98347         19823         98016           27         18188         98341         19851         98016           28         18166         98336         1980         98004           29         18195         98381         19908         97998           30         18224         98325         19937         97992           31         18252         98320         19965         97987           32         18281         98315         19994         97981           33         18309         98310         20022         97975           34         18398         98304         20051         97969           35         18367         98299         20079         97963           36         18395         98294         20108         97958           37         18424         98288         20136         97952           38         18452         98283         20165         97946           39         18481         98272         20193         97946           40         18509         98272         20222         97934           41         18538         98267   | 21474<br>21502 | 97667          | 23175          | 97278                   | 24869          | 96858                  | 36        |
| 27         18138         98341         19851         98010           28         18166         98336         19880         98004           29         18195         98331         19908         97998           30         18224         98325         19937         97992           31         18252         98320         19965         97987           32         18281         98315         19994         97981           33         18309         98310         20022         97975           34         18338         98304         20051         97969           35         18367         98299         20079         97963           36         18395         98294         20108         97958           37         18424         98288         20136         97952           38         18452         98283         20165         97946           39         18481         98272         20222         97934           41         18538         98267         20222         97934           41         18538         98267         20222         97934           41         18538         98267  | 21530          | 97661<br>97655 | 23203<br>23231 | 97271                   | 24897<br>24925 | 96851                  | 35        |
| 28         18166         98336         19880         98004           29         18195         98381         19908         97998           30         18224         98325         19965         97987           31         18252         98315         19994         97981           32         18809         98315         19994         97981           33         18309         98310         20022         97975           34         18398         98304         20051         97963           35         18367         98299         20079         97963           36         18395         98294         20108         97958           37         18424         98288         20136         97958           38         18452         98283         20165         97946           39         18481         98277         20193         97940           40         18509         98272         20222         97934           41         18538         98267         20250         97928           42         18567         98261         20379         97922           43         18595         98256  | 21559          | 97648          | 23260          | 97264<br>9 <b>72</b> 57 | 24923          | 96844<br>96837         | 94        |
| SO         18224         98325         19937         97992           31         18252         98320         19965         97987           32         18281         98315         19994         97981           33         18309         98310         20022         97975           34         18338         98304         20051         97969           35         18367         98299         20079         97963           36         18395         98294         20108         97958           37         18424         98288         20136         97952           38         18452         98283         20165         97946           39         18481         98272         20193         97946           40         18509         98272         20222         97946           41         18538         98267         20193         97940           40         18509         98272         20222         97934           41         18538         98267         20350         97928           42         18567         98261         20279         97922           43         18652         98250  | 21587          | 97642          | 23388          | 97251                   | 24982          | 96829                  | \$3<br>32 |
| 31         18252         98320         19965         97987           52         18281         98315         19994         97981           33         18309         98310         20022         97975           34         18388         98304         20051         97969           35         18367         98299         20079         97963           36         18395         98294         20108         97958           37         18424         98288         20136         97946           39         18481         98272         20193         97940           40         18509         98272         20222         97934           41         18538         98267         20193         97940           40         18509         98272         20222         97934           41         18538         98267         2030         97928           42         18567         98261         20279         97922           43         18695         98250         20364         97905           44         18624         98250         20364         97905           45         18681         98240   | 21616          | 97636          | 23316          | 97244                   | 25010          | 96822                  | 31        |
| 82         18281         98315         19994         97981           33         18309         98310         20022         97975           34         18398         98304         20051         97969           35         18367         98299         20079         97963           36         18395         98294         20108         97958           37         18424         98288         20136         97952           38         18452         98283         20165         97946           39         18481         98272         20222         97934           40         18509         98272         20222         97934           41         18538         98267         20350         97928           42         18567         98261         20279         97922           43         18595         98256         20307         97916           44         18624         98250         20336         97910           45         18652         98245         20364         97905           46         18681         98240         20393         97899           47         18710         98234  | 21644          | 97630          | 23345          | 97237                   | 25038          | 96815                  | 30        |
| 33         18509         98310         20022         97975           34         18338         98304         20051         97969           35         18367         98299         20079         97963           36         18395         98294         20108         97958           37         18424         98288         20136         97952           58         18452         98283         20165         97946           39         18481         98272         20222         97940           40         18509         98272         20222         97940           41         18538         98267         20250         97928           42         18567         98261         20279         97924           43         18595         98261         20307         97916           44         18652         98245         20364         97905           45         18652         98245         20364         97905           46         18681         98240         20336         97910           47         18710         98234         20421         97893           47         18767         98223  | 21672          | 97623          | 23373          | 97230                   | 25066          | 96807                  | 29        |
| 34         18938         98304         20051         97969           35         18367         98299         20079         97963           36         18395         98294         20108         97958           37         18424         98288         20136         97952           38         18452         98283         20165         97946           39         18481         98277         20193         97940           40         18509         98272         20222         97934           41         18538         98267         20250         97928           42         18567         98261         20279         97922           43         18595         98256         20379         97916           44         18624         98250         20336         97910           45         18652         98245         20364         97905           46         18681         98240         20393         97893           47         18710         98284         20421         97887           49         18767         98282         20450         97887           50         18795         98218  | 21701          | 97617          | 23401          | 97223                   | 25094          | 96800                  | 28        |
| 35         18967         98299         20079         97963           36         18395         98294         20108         97958           37         18424         98288         20136         97946           38         18452         98283         20165         97946           39         18481         98272         20193         97940           40         18509         98272         20222         97934           41         18538         98267         20250         97928           42         18567         98261         20279         97922           43         18595         98256         20307         97916           44         18624         98250         20364         97905           45         18624         98250         20364         97905           46         18681         98240         20393         97899           47         18710         98234         20421         97887           48         18738         98292         20450         97861           50         18795         98218         20507         97875           51         18824         98212  | 21729          | 97611          | 23429          | 97217                   | 25122          | 96793                  | 27        |
| 36         18395         98294         20108         97958           37         18424         98288         20136         97952           38         18452         98283         20165         97946           39         18481         98277         20193         97940           40         18509         98272         20222         97934           41         18538         98267         20350         97928           42         18567         98261         20279         97922           43         18595         98256         20307         97916           44         18624         98250         20336         97910           45         18652         98245         20364         97905           46         18681         98240         20393         97899           47         18710         98234         20421         97893           48         18767         98223         20478         97861           50         18795         98218         20507         97875           51         18824         98212         20555         97869           52         18852         98207  | 21758<br>21786 | 97604<br>97598 | 23458<br>23486 | 97210                   | 25151          | 96786                  | 26        |
| 37         18424         98288         20136         97952           38         18452         98283         20165         97946           39         18481         98277         20193         97940           40         18509         98272         20222         97934           41         18538         98267         20250         97928           42         18567         98261         20279         97922           43         18595         98256         20307         97916           44         18624         98250         20336         97910           45         18652         98245         20364         97905           46         18681         98240         20393         97899           47         18710         98234         20421         97893           48         18738         98229         20450         97887           49         18767         98223         20478         97881           50         18795         98218         20507         97875           51         18834         98212         20535         97860           52         18852         98207  | 21814          | 97592          | 23514          | 97203<br>97196          | 25179<br>25207 | 96778                  | 25<br>24  |
| 39         18481         98277         20193         97940           40         18509         98272         20222         97934           41         18538         98267         20250         97928           42         18567         98261         20279         97922           43         18595         98256         20307         97916           44         18624         98250         20336         97910           45         18652         98245         20364         97905           46         18681         98240         20393         97893           47         18710         98234         20421         97893           48         18738         98229         20450         97887           49         18767         98283         20478         97881           50         18795         98218         20507         97875           51         418824         98212         20355         97860           52         18852         98207         20563         97863           53         18881         98201         20592         97857           54         18910         98196   | 21843          | 97585          | 23542          | 97189                   | 25235          | 96771<br>96764         | 23        |
| 40         18509         98272         20222         97934           41         18538         98267         20250         97928           42         18567         98261         20279         97922           43         18595         98256         20307         97916           44         18624         98250         20336         97910           45         18681         98245         20364         97905           46         18681         98240         20393         97899           47         18710         98234         20421         97893           48         18738         98229         20450         97861           50         18795         98218         20507         97875           51         18824         98212         20355         97860           52         18852         98207         20663         97863           53         18881         98201         20592         97857           54         18910         98196         20620         97851           55         18938         98190         20649         97845           56         18967         98185  | 21871          | 97579          | 23571          | 97182                   | 25263          | 96756                  | 22        |
| 41         18538         98267         20250         97928           42         18567         98261         20279         97922           43         18595         98256         20307         97916           44         18624         98250         20336         97910           45         18652         98245         20364         97905           46         18681         98240         20393         97899           47         18710         98234         20421         97887           48         18738         98229         20450         97887           49         18767         98281         20507         97875           51         418824         98212         20355         97860           52         18852         98207         20563         97863           53         18881         98201         20592         97857           54         18910         98196         20620         97857           54         18988         98190         20649         97845           56         18967         98185         20677         97839  | 21899          | 97573          | 23599          | 97176                   | 25291          | 96749                  | 21        |
| 42         18567         98261         20279         97922           43         18595         98256         20307         97916           44         18624         98250         20336         97910           45         18652         98245         20364         97905           46         18681         98240         20393         97899           47         18710         98234         20421         97893           48         18738         98229         20450         97887           49         18767         98233         20478         97881           50         18795         98218         20507         97875           51         418824         98212         20355         97860           52         18652         98207         20663         97863           53         18881         98201         20592         97857           54         18910         98196         20620         97857           54         18918         98190         20649         97845           56         18967         98185         20077         97839  | 21928          | 97566          | 23627          | 97169                   | 25320          | 96742                  | 20        |
| 43         18595         98256         20307         97916           44         18624         98250         20336         97910           45         18652         98245         20364         97905           46         18681         98240         20393         97899           47         18710         98234         20421         97893           48         18738         98229         20450         97887           49         18767         98223         20478         97861           50         18795         98218         20507         97875           51         18824         98212         20535         97860           52         18852         98207         20663         97863           53         18881         98201         20592         97857           54         18910         98196         20620         97857           55         18938         98190         20649         97845           56         18967         98185         20677         97839  | 21956          | 97560          | 23656          | 97162                   | 25348          | 96734                  | 19        |
| 44         18624         98250         20336         97910           45         18652         98245         20364         97905           46         18681         98240         20393         97899           47         18710         98234         20421         97893           48         18738         98229         20450         97887           49         18767         98223         20478         97861           50         18795         98218         20507         97875           51         48824         98212         20535         97860           52         18852         98207         20663         97863           53         18881         98201         20592         97857           54         18910         98196         20620         97851           55         18938         98190         20649         97845           56         18967         98185         20677         97839   | 21985          | 97553          | 23684          | 97155                   | 25376          | 96727                  | 18        |
| 45         18652         98245         20364         97905           46         18681         98240         20393         97899           47         18710         98234         20421         97893           48         18738         98229         20450         97887           49         18767         98223         20478         97881           50         18795         98218         20507         97875           51         48824         98212         20535         97860           52         18852         98207         20563         97863           53         18881         98201         20592         97857           54         18910         98196         20620         97857           55         18938         98190         20649         97845           56         18967         98185         20677         97839  | 22013<br>22041 | 97547          | 28712          | 97148                   | 25404          | 96719                  | 17        |
| 46         18681         98240         20393         97899           47         18710         98234         20421         97893           48         18738         98229         20450         97887           49         18767         98223         20478         97881           50         18795         98218         20507         97875           51         418824         98212         20535         97869           52         18652         98207         20663         97863           53         18881         98201         20592         97857           54         18910         98196         20620         97851           55         18938         98190         20649         97845           56         18967         98185         20677         97839  | 22041          | 97541<br>97534 | 23740<br>23769 | 97141                   | 25432          | 96712                  | 16        |
| 47         18710         98234         20421         97893           48         18738         98229         20450         97887           49         18767         98223         20478         97861           50         18795         98218         20507         97875           51         18824         98212         20535         97860           52         18852         98207         20663         97863           53         18881         98201         20592         97857           54         18910         98196         20620         97857           55         18938         98190         20649         97845           56         18967         98185         20677         97839  | 22098          | 97528          | 23797          | 97134<br>97127          | 25460<br>25488 | 96705<br>96697         | 15<br>14  |
| 49         18767         98223         20478         97881           50         18795         98218         20507         97875           51         4824         98212         20535         97860           52         18852         98207         20563         97863           53         18881         98201         20592         97857           54         18910         98196         20620         97851           55         18938         98190         20649         97845           56         18967         98185         20677         97839   | 22126          | 97521          | 23825          | 97120                   | 25516          | 96690                  | 13        |
| 50         18795         98218         20507         97875           51         418824         98212         20535         97869           52         18852         98207         20563         97863           53         18881         98201         20592         97857           54         18910         98196         20620         97851           55         18938         98190         20649         97845           56         18967         98185         20677         97839  | 22155          | 97515          | 23853          | 97113                   | 25545          | 96682                  | 12        |
| 51     .18824     98212     20535     97860       52     18852     98207     20563     97863       53     18881     98201     20592     97857       54     18910     98196     20620     97851       55     18938     98190     20649     97845       56     18967     98185     20677     97839   | 22183          | <b>975</b> 08  | 23882          | 97103                   | 25573          | 96675                  | 11        |
| 52         18852         98207         20563         97863           53         18881         98201         20592         97857           54         18910         98196         20620         97851           55         18938         98190         20649         97845           56         18967         98185         20677         97839   | 22212          | 97502          | 23910          | 97100                   | 25601          | 96667                  | 10        |
| 53         18881         98201         20592         97857           54         18910         98196         20620         97851           55         18938         98190         20649         97845           56         18967         98185         20677         97839  | 22240          | 97496          | <b>239</b> 38  | 97093                   | 25629          | 96660                  | 9         |
| 54   18910   98196   20620   97851   55   18938   98190   20649   97845   56   18967   98185   20677   97839   | 22268          | 97489          | 23966          | 97086                   | 25657          | 96653                  | 8         |
| 55 18938 98190 20649 97845<br>56 18967 98185 20677 97839   | 22297          | 97483          | 23995          | 97079                   | 25685          | 96645                  | 7         |
| 56 18967 98185 20677 97839   | 22325<br>22353 | 97476<br>97470 | 24023<br>24051 | 97072<br>97065          | 25713<br>95741 | 96638                  | 6 5       |
|  | 22382          | 97463          | 24079          | 97058                   | 25741<br>25769 | 96630<br>96623         | 4         |
| 57 18995 98179 20706 97833   | 22410          | 97457          | 24108          | 97051                   | 25798          | 96615                  | S         |
| 58   19024   98174   20734   97827   | 22438          | 97450          | 24136          | 97044                   | 25826          | 96608                  | 2         |
| CO   10001   001 do   00=01   al   | 22467          | 97444          | 24164          | 97037                   | 25854          | 96600                  | 1         |
|  | 22495          | 97437          | 24192          | 97030                   | 25882          | 96593                  | 0         |
|  | N. cos.        | N. sine        | N. cos.        | v. sine.                | N. cos         | N. sine.               | Min.      |
| 790 780  | 7              | 70             | 7              | 50                      | ·              | 50                     |           |

|          |                |                |                | NAT            |                |                | NES            |                |                |                |            |
|----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------|
|          | 1.             | 5°             |                | 6°             | 1              | 70             | 1              | 80             |                | 9°             | l          |
| Min.     | N. sine.       | N. cos.        | 1          |
| 0        | 25882          | 96593          | 27564          | 96126          | 29237          | 95630          | 30902          | 95106          | 32557          | 94552          | 60         |
| 1        | 25910          | 96585          | 27592          | 96118          | 29265          | 95622          | 30902          | 95097          | 32584          | 94542          | 59         |
| 2        | 25938          | 96578          | 27620          | 96110          | 29293          | 95613          | 30929          | 95088          | 32612          | 94533          | 58         |
| 3        | 25966          | 96570          | 27648          | 96102          | 29321          | 95605          | 30985          | 95079          | 32639          | 94523          | 57         |
| 4        | 25994          | 96562          | 27676          | 96094          | 29348          | 95596          | 31012          | 95070          | 32667          | 94514          | 56         |
| 5        | 26022          | 96555          | 27704          | 96086          | 29376          | 95588          | 31040          | 95061          | 32694          | 94504          | 55         |
| 6        | 26050          | 96547          | 27731          | 96078          | 29404          | 95579          | 31068          | 95052          | 32722          | 94495          | 54         |
| 7        | 26079          | 96540          | 27759          | 96070          | 29432          | 95571          | 31095          | 95043          | 32749          | 94485          | 53         |
| 8        | 26107          | 96532          | 27787          | 96062          | 29460          | 95562          | 31123          | 95033          | 32777          | 94476          | 52         |
| 9        | 26135          | 96524          | 27815          | 96054          | 29487          | 95554          | 31151          | 95024          | 32804          | 94466          | 51         |
|          |                |                |                | 50051          |                |                | <u> </u>       |                |                |                |            |
| 10       | 26163          | 96517          | 27843          | 96046          | 29515          | 95545          | 31178          | 95015          | 32832          | 94457          | <i>5</i> 0 |
| 11       | 26191          | 96509          | 27871          | 96037          | 29543          | 95536          | 31206          | 95006          | 32859          | 94447          | 49         |
| 18       | 26219          | 96502          | 27899          | 96029          | 29571          | 95528          | 31233          | 94997          | 32887          | 94496          | 48         |
| 13       | 26247          | 96494          | 27927          | 96021          | 29599          | 95519          | 31261          | 94988          | 32914          | 94428          | 47         |
| 14       | 26275          | 96486          | 27955          | 96013          | 29626          | 95511          | 31289          | 94979          | 82942          | 94418          | 46         |
| 15       | 26303          | 96479          | 27983          | 96005          | 29654          | 95502          | 31316          | 94970          | 32969          | 94409          | 45         |
| 16       | 26331          | 96471          | 28011          | 95997          | 29682          | 95493          | 31344          | 94961          | 32997          | 94399          | 44         |
| 17       | 26359          | 96463          | 28039          | 95989          | 29710          | 95485          | 31372          | 94952          | 33024          | 94390          | 48         |
| 18       | 26387          | 96456          | 28067          | 95981          | 29737          | 95476          | 81399          | 94943          | 33051          | 94380          | 42         |
| 19       | 26415          | 96448          | 28095          | 95972          | 29765          | 95467          | 31427          | 94933          | 33079          | 94370          | 41         |
| 20       | 26448          | 96440          | 28123          | 95964          | 29793          | 95459          | 31454          | 94924          | 33106          | 94361          | 40         |
| 21       | 26471          | 96433          | 28150          | 95956          | 29821          | 95450          | 31482          | 94915          | 33134          | 94951          | 39         |
| 22       | 26500          | 96425          | 28178          | 95948          | 29849          | 95441          | 31510          | 94906          | 33161          | 94342          | 38         |
| 23       | 26528          | 96417          | 28206          | 95940          | 29876          | 95433          | 31537          | 94897          | 33189          | 94332          | 97         |
| 24       | 26556          | 96410          | 28234          | 95931          | 29904          | 95424          | 31565          | 94888          | 33216          | 94322          | 36         |
| 25       | 26584          | 96402          | 28262          | 95923          | 29932          | 95415          | 31593          | 94878          | 33244          | 94313          | 95         |
| 26       | 26612          | 96394          | 28290          | 95915          | 29960          | 95407          | 31620          | 94869          | 33271          | 94303          | 94         |
| 27       | 26640          | 96386          | 28318          | 95907          | 29987          | 95398          | 31648          | 94860          | 33298          | 94293          | <b>3</b> 3 |
| 28       | 26668          | 96379          | 28346          | 95898          | 30015          | 95389          | 31675          | 94851          | 33326          | 94284          | 32         |
| 29       | 26696          | 96371          | 28374          | 95890          | 30043          | 95380          | 31703          | 94842          | 33353          | 94274          | 91         |
|          |                |                |                |                |                |                |                | 0.4000         |                | 24004          |            |
| 30       | 26724          | 96363          | 28402          | 95882          | 30071          | 95372          | 31790          | 94832          | 33381          | 94264          | 30<br>29   |
| 31       | 26752          | 96355          | 28429          | 95874          | 30098          | 95363          | 31758          | 94823          | 33408          | 94254<br>94245 | 29         |
| 32       | 26780          | 96347          | 28457          | 95865          | 30126          | 95354          | 31786          | 94814<br>94805 | 93496          |                | 27         |
| 33<br>34 | 26808          | 96340          | 28485          | 95857          | 30154          | 95345          | 31813          | 94795          | 99463<br>99490 | 94235<br>94225 | #6         |
| 35       | 26836          | 96332          | 28513          | 95849          | 30182          | 95337          | 31841<br>31868 | 94786          | 33518          | 94215          | 25         |
| 36       | 26864<br>26892 | 96324          | 28541          | 95841          | 30209<br>30237 | 95328<br>95319 | 31896          | 94777          | 33545          | 94206          | 94         |
| 37       | 26920          | 96316<br>96308 | 28569<br>28597 | 95832          | 30257          | 95319          | 31923          | 94768          | <b>33573</b>   | 94196          | 23         |
| 38       | 26948          | 96301          | 28625          | 95824<br>95816 | 30292          | 95301          | 31951          | 94758          | 39600          | 94186          | 22         |
| 39       | 26976          | 96293          | 28652          | 95807          | 30320          | 95293          | 31979          | 94749          | 33627          | 94176          | 21         |
|          | 20310          | 30233          | 20002          | 33007          | 30020          | 30230          |                |                |                |                |            |
| 40       | 27004          | 96285          | 28680          | 95799          | 30348          | 95284          | 32006          | 94740          | <b>3</b> 3655  | 94167          | 20         |
| 41       | . 2,7032       | 96277          | 28708          | 95791          | 30376          | 95275          | 32034          | 94730          | \$3682         | 94157          | 19         |
| 42       | 27060          | 96269          | 28736          | 95782          | 30403          | 95266          | 32061          | 94721          | 39710          | 94147          | 18         |
| 43       | 27088          | 96261          | 28764          | 95774          | 30431          | 95257          | 32089          | 94712          | 33737          | 94197          | 17         |
| 44       | 27116          | 96253          | 28792          | 95766          | 30459          | 95248          | <b>32</b> 116  | 94702          | 99764          | 94127          | 16         |
| 45       | 27144          | 96246          | 28820          | 95757          | 30486          | 95240          | 32144          | 94698          | 33792          | 94118          | 15         |
| 46       | 27172          | 96238          | 28847          | 95749          | 30514          | 95231          | 32171          | 94684          | 33819          | 94108          | 14         |
| 47       | 27200          | 96230          | 28875          | 95740          | 30542          | 95222          | 32199          | 94674          | 33846          | 94098          | .19        |
| 48       | 27228          | 96222          | 28903          | 95732          | 30570          | 95213          | 32227          | 94665          | 33874          | 94068          | 12         |
| 49       | 27256          | 96214          | 28931          | 95724          | 30597          | 95204          | 32254          | 94656          | 33901          | 94078          | 11         |
| 50       | 27284          | 96906          | 28959          | 95715          | 30625          | 95195          | 32282          | 94646          | 33929          | 94068          | 10         |
| 51       | 27312          | 96198          | 28987          | 95707          | 30653          | 95186          | 32309          | 94637          | 33956          | 94058          | 9          |
| 52       | 27340          | 96190          | 29015          | 95698          | 30680          | 95177          | 32337          | 94627          | 33983          | 94049          | 8          |
| 53       | 27368          | 96182          | 29042          | 95690          | 30708          | 95168          | 92364          | 94618          | 34011          | 94039          | 7          |
| 54       | 27396          | 96174          | 29070          | 95681          | 30736          | 95159          | 32392          | 94609          | 94038          | 94029          | 6          |
| 55       | 27424          | 96166          | 29098          | 95673          | 30763          | 951 <i>5</i> 0 | 32419          | 94599          | 34065          | 94019          | 5          |
| 56       | 27452          | 96158          | 29126          | 95664          | 30791          | 95142          | 92447          | 94590          | 94099          | 94009          | 4          |
| 57 .     | 27480          | 96150          | 29154          | 95656          | 30819          | 95133          | 32474          | 94580          | 34120          | 93999          | 3          |
| 58       | 27508          | 96142          | 29182          | 95647          | 30846          | 95124          | 32502          | 94571          | 94147          | 98989          | 3          |
| 59       | 27536          | 96134          | 29209          | 95639          | 30874          | 95115          | 32529          | 94561          | 34175          | 93979          | 1          |
| 60       | 27564          | 96126          | 29237          | 95630          | 30902          | 95106          | 32557          | 94552          | 34202          | 93969          | 0          |
|          | N. cos.        | N. sine.       | N and          | N. sine.       | N and          | N. sine        | N. cos.        | N sins         | N. cos.        | N. sine        | Min        |
| 1        |                |                |                |                |                |                |                |                |                |                |            |
| !        | . 7            | .to            | 7              | 8°             | 7              | 20             | 7              | 10             | 7              | 0°             | ,          |

| Min,   N. sine   N. cos,   N. cos,   N. sine   N. cos,   N. cos,   N. sine   N. cos,   N. cos,   N. cos,   N. sine   N. cos,   N. cos  |      | 20       | 90      | 2     | lo,    | 2        | 20       | 2        | 30      | 9                | 40    | T    |
|--|------|----------|---------|-------|--------|----------|----------|----------|---------|------------------|-------|------|
| 1 34229 93950 33861 93948 37488 92707 93100 9203 40700 91343 59 2 3427 33949 35891 9337 37515 9267 59180 9202 40725 91381 58 3 34284 93939 35918 93297 37542 92686 91533 92016 40753 91319 57 4 34311 55929 35915 93575 93606 93675 93180 92005 40768 91307 56 6 34366 33000 58000 93935 37629 92653 93249 94086 691255 55 6 34369 38909 36027 99386 37629 92653 93249 91994 40806 91272 55 8 3431 93890 36027 99386 37629 92653 93249 91994 40806 91272 55 8 3431 93889 36027 99386 37629 92653 93249 91994 40806 91272 55 8 3432 38899 36024 93264 37708 92620 93914 91995 40886 91260 92 9 34448 93870 36081 93264 37708 92620 93914 91956 40886 91260 92 10 34475 93869 36108 93253 37759 92689 39341 91954 40991 91248 51 11 34563 93859 36159 93223 37818 9257 93934 91914 40992 91212 48 12 34530 93849 36162 93232 37818 9257 93934 91914 40992 91212 48 13 34557 93839 36108 93224 37811 92576 39421 91902 41019 91200 47 14 34584 93892 96217 93211 37838 92565 39448 91891 41045 91188 46 15 34612 98119 93624 93201 37865 92554 39474 91879 41045 91188 46 16 34639 93809 9621 93190 37865 92554 39474 91879 41045 91186 44 18 34684 93789 56325 93169 37946 92521 93555 91846 41098 91164 44 19 34721 93779 58652 93169 37946 92521 93555 91846 41161 91140 42 19 34721 93779 58652 93169 37948 92510 39555 91856 41125 91172 43 18 34684 93789 56325 93169 37948 92510 39581 91853 41178 91128 41 19 34721 93779 58652 93159 37978 92510 39581 91853 41178 91128 41 19 34721 93779 58652 93159 37978 92510 39581 91853 41178 91128 41 19 34721 93779 58654 93254 38080 92477 39661 91799 41257 91092 38 23 34830 33788 5666 38059 3808 38215 92110 39582 91808 41231 91104 42 24 34867 33788 58652 93169 38384 93875 91757 41310 91068 35 25 34884 93718 36515 93085 38134 92444 39741 91764 41390 91068 31 25 34889 38778 58659 3968 38859 39688 91777 41294 9108 32 23 34890 38788 58667 39659 38988 38889 38787 91799 41449 9108 3108 3108 3289 38989 38667 38689 39899 38680 38689 39899 38680 38689 39899 38680 38689 39899 38680 38689 39899 38680 38689 38690 38689 38690 38689 38690 38689 38690 38690 3   | Min. | N. sine. | N. cos. |       |        |          |          | N. sine. | N. cos. | N. sine. N. cos. |       | ]    |
| 2 54257 59349 5939 5918 59327 37542 9268 59153 92016 40752 91513 58 58 54421 59529 59518 5952 37542 9268 59153 92016 40753 91319 57 57 59539 59519 5952 37542 92653 92654 92050 40780 91207 56 54 54366 93090 50000 98295 37542 92653 92954 91982 40833 91893 5754 93656 37549 92664 30207 91944 40806 91272 53 58 54448 93879 36045 92524 37649 92642 39260 91971 40866 91272 53 58 54448 93879 36045 92524 37656 92653 92954 91982 40833 91248 51 54 54 54 54 54 54 54 54 54 54 54 54 54   | 0    | 34202    | 98969   | 35837 | 93358  | 37461    | 92718    | 39073    | 92050   | 40674            | 91355 | 60   |
| 3         34284         99393         35918         93297         37542         92686         91533         92016         40753         91131         57           5         34393         93919         35973         93006         37595         93664         39207         91984         40806         91295         55           6         34366         39309         36002         93263         37693         93653         99209         91444         91982         40838         91223         9124           8         34418         38899         36054         93274         37676         99261         39287         91950         40866         91222         35           10         34475         38689         36108         93233         37757         99289         39367         91944         40913         91248         51           11         34503         38489         36150         93233         37717         93934         91914         40992         91243         906         12244         41           14         34561         93438         37757         93894         99194         40990         91245         50         61224         41         409   |      |          | 93959   | 35864 | 93348  | 37488    | 92707    | 39100    | 92039   | 40700            | 91343 | 59   |
| 4 94811 95929 85945 93916 37569 92675 93180 93003 40780 912075 56 943666 93269 5575 95956 9464 93207 93944 40669 912075 56 943656 93959 95000 93295 57629 92653 93924 91994 40669 912072 56 9464 93060 91911 40860 912072 56 9464 93060 91911 40860 912072 56 9464 93060 91911 40860 912072 56 95060 93041 9464 93670 91014 40860 912072 56 9464 93060 91014 94600 912072 56 9464 93060 91014 94660 912072 56 9464 93060 91014 94600 912072 56 9464 93060 91014 94600 912072 56 9466 912072 56 9466 912072 56 9466 912072 56 94660 912072 56 94670 912072 56 9   |      |          | 93949   |       |        | 1        |          |          |         |                  |       |      |
| 6         34389         93919         55973         93604         39207         91994         40806         91925         55           7         34393         93899         36020         93895         37629         99653         93934         91982         08083         91283         52           8         34412         93899         36024         33773         92620         99814         91948         40913         91248         51           10         34475         93869         36108         93243         37757         92690         93941         91948         40913         91248         51           11         34530         93849         36162         93243         37757         92599         93957         91924         4096         91224         49           12         34530         93849         36162         93223         37784         92576         93941         91904         40906         91224         49           14         34564         93890         36217         93211         37838         92563         39474         91014         40929         91212         43           16         34694         93890         36221 </td <td></td>  |      |          |         |       |        |          |          |          |         |                  |       |      |
| 6 \$4366 \$9399 \$3600 \$36027 \$3652 \$7649 \$9642 \$3620 \$1971 \$40860 \$19272 \$55 \$7649 \$9642 \$3620 \$1971 \$40860 \$19272 \$55 \$7649 \$9642 \$3620 \$1971 \$40860 \$19272 \$55 \$7649 \$9642 \$3620 \$1971 \$40860 \$19272 \$55 \$7649 \$9642 \$3620 \$1971 \$40860 \$19260 \$29 \$20 \$9844 \$3644 \$3675 \$3686 \$36345 \$3730 \$9260 \$9834 \$19194 \$40913 \$1248 \$51 \$1 \$34503 \$93869 \$36134 \$3243 \$37757 \$92598 \$39367 \$19924 \$40969 \$1924 \$40913 \$1248 \$13 \$34557 \$93869 \$36135 \$3248 \$37757 \$92598 \$39367 \$19924 \$40969 \$1924 \$40913 \$1248 \$13 \$4503 \$93840 \$36162 \$30329 \$37784 \$92587 \$3994 \$19194 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40929 \$19124 \$40920 \$19164 \$40813 \$4639 \$3849 \$3860 \$3621 \$33193 \$1865 \$3912 \$92563 \$30448 \$1851 \$41045 \$91188 \$47045 \$116 \$34639 \$38409 \$36219 \$33190 \$3789 \$29253 \$30501 \$91868 \$41025 \$91176 \$451 \$116 \$34639 \$3849 \$3899 \$36289 \$93860 \$37919 \$92532 \$30501 \$91868 \$41025 \$91164 \$461 \$19184 \$4721 \$93779 \$36532 \$93159 \$3793 \$9251 \$9355 \$19856 \$41125 \$91154 \$4115 \$1164 \$49201 \$34639 \$3748 \$36325 \$3169 \$3793 \$39251 \$39581 \$91856 \$41125 \$91154 \$415 \$116 \$4004 \$19184 \$4115 \$1164 \$49201 \$34639 \$3748 \$36449 \$31167 \$38050 \$92477 \$36651 \$9180 \$41231 \$91104 \$49201 \$3460 \$3793 \$34830 \$93738 \$36461 \$93116 \$3800 \$92465 \$3688 \$91810 \$41231 \$91104 \$49201 \$3460 \$3688 \$93748 \$36424 \$3857 \$9328 \$36489 \$3106 \$38107 \$92455 \$37115 \$91755 \$41310 \$91068 \$3799 \$34999 \$3688 \$36569 \$30364 \$38161 \$92455 \$3715 \$91755 \$41310 \$91068 \$3799 \$34999 \$3688 \$36569 \$30364 \$38161 \$92449 \$39740 \$3925 \$91810 \$41237 \$91005 \$3529 \$3928 \$34999 \$3667 \$3663 \$30052 \$38241 \$93990 \$91694 \$41337 \$91056 \$3529 \$3928 \$34999 \$3667 \$3665 \$3042 \$39245 \$39245 \$39715 \$3715 \$91755 \$41310 \$91068 \$3799 \$34990 \$3668 \$36569 \$3074 \$38188 \$9241 \$39390 \$91694 \$41439 \$91000 \$3137 \$36048 \$36669 \$3688 \$38349 \$9241 \$39390 \$91694 \$41499 \$9000 \$3689 \$36569 \$3689 \$3924 \$39305 \$39488 \$9175 \$41449 \$91008 \$3160 \$3049 \$3945 \$3950 \$39567 \$36667 \$3650 \$3042 \$39 |      |          |         |       |        |          |          |          |         |                  |       |      |
| 7 34393 98899 36024 93744 37676 92631 39267 91959 140866 91260 52 9 34448 93879 36081 93264 37703 92620 39814 91948 40913 91248 51 10 34475 93869 31610 93264 37703 92620 39814 91948 40913 91248 51 12 34530 93869 36162 93292 37819 92576 39421 91902 41019 91200 47 14 34584 93869 36162 93292 37811 92576 39421 91902 41019 91200 47 14 34584 93869 36162 93292 37811 92576 39421 91902 41019 91200 47 14 34584 93890 36211 9310 37869 29256 39448 91801 41045 91188 46 16 34639 93809 36217 9310 37869 29254 39501 1764 177 34666 39394 93789 36228 93180 37892 92543 39501 91868 41052 91164 41 17 34666 39799 36228 93189 3799 29254 39501 91868 41052 91164 41 17 34669 39789 36228 93189 3799 32510 39581 91833 41178 91184 41 17 34684 93789 36328 93189 3799 92592 93543 39501 91868 41058 91164 44 18 18 34694 93789 36328 93189 3799 92592 93589 91864 41151 91144 42 12 19 34721 93779 36532 93159 37979 92510 39581 91833 41178 91128 41 12 19 34721 93779 36532 93159 37979 92510 39581 91833 41178 91128 41 12 19 34721 93779 36532 93159 37973 92510 39581 91833 41178 91128 41 12 19 34775 93759 36406 93137 38026 92488 39655 91804 41231 91104 42 23 34830 93738 36441 93116 38080 92466 39688 91787 41231 91104 43 22 34830 93738 36441 93116 38080 92465 39688 91787 41231 91104 43 22 34880 93788 36484 93116 38080 92445 39781 91741 4130 91008 37 24 34884 93718 36559 93074 38188 9244 39768 3659 93074 38188 9244 39768 3659 93078 38134 9244 39771 91775 41310 91068 36 25 34912 93708 36569 93074 38188 9249 39768 91741 41390 91032 38 38 3499 3667 36637 36637 30542 38249 39399 3868 91787 41231 9104 43 38 3406 93687 38781 9300 93849 93179 93414 39741 91764 41337 91056 36 36 34912 93768 93699 93698 93669 93668 36569 93074 38188 9249 39599 93688 93667 36667 36637 93042 38268 93299 93689 91683 41469 91090 9369 9369 93699 93   | Б    |          |         |       |        |          |          |          |         |                  |       |      |
| 8         34421         93898         96081         93244         97707         92631         9927         99198         0913         91248         51           10         34475         98869         36108         93253         37730         92609         98341         91946         40939         91236         50           11         34503         98849         36135         93243         37757         92598         93967         91924         4066         91224         4366           13         34557         98893         36190         93222         37814         92565         39481         91990         41049         91200         47           14         34548         93890         36217         9311         37865         92565         39448         91801         41045         91186         41645         11645         91869         9271         3910         37892         92556         39444         91879         41072         91176         4262         41164         1464         1464         1465         1468         43693         93891         38519         39489         92517         39401         37762         92523         39528         91856         41125<  |      |          |         |       |        |          |          |          |         |                  |       |      |
| 9   34448   93879   50681   93264   37705   92620   93914   91948   40913   91248   51   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 10   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 11 34503 98459 36162 93293 37787 92598 39367 91923 49066 91224 123 13 34557 98839 36160 93222 37811 92576 39421 91902 41019 91200 47 14 34584 93829 36217 93211 37838 92565 39448 91891 41045 91188 415 34612 96819 36244 99201 37865 92554 39474 91879 41072 91176 45 16 34639 93809 36271 93190 37892 92554 39474 91879 41072 91176 45 17 34666 93799 36298 98180 37919 92532 39528 91856 411925 91152 48 18 34694 93789 36325 93169 37946 92532 39528 91856 41125 91152 43 18 34694 93789 36325 93169 37946 92532 39555 91845 41125 91125 43 19 34775 93759 36532 93159 37973 92510 39581 91833 41178 91116 40 21 34775 93759 36406 93137 38026 92488 39635 91810 41123 91104 32 2 34803 93748 36434 93127 38053 92477 39661 91799 41257 91092 38 34880 93738 36461 93116 38080 92466 3688 91787 41259 91092 38 34839 93738 36481 93116 38080 92466 3688 91787 41259 91092 38 34839 93738 36484 93106 38107 92455 39715 91775 41310 91068 36 34912 93708 36549 3106 38107 92455 39715 91775 41310 91068 36 34912 93708 36549 39305 38813 92441 39741 91764 41337 91036 35 34912 93708 36569 39074 381818 92421 39799 91749 41469 9088 32 34939 39675 36623 93053 38215 92410 39822 91799 41416 91020 31 38 32 34939 39678 36569 39074 38188 92421 39799 91774 41390 91032 33 34 34 34 34 34 34 34 34 34 34 34 34  |      |          |         |       |        |          |          | <u> </u> |         | <b>!</b>         |       | ·    |
| 12 34530 93849 36162 9329 37784 92587 39394 91914 40992 91212 18 13 34557 93839 36190 93222 37811 92576 39421 91902 47 14 34584 93829 36217 93211 37838 92565 39448 91891 41045 91180 47 15 34632 93809 36241 93109 37838 92565 39448 91879 41072 91176 45 16 34639 93809 36271 93190 37892 92543 39501 91868 41098 91164 44 17 34666 93799 36298 93180 37919 92532 39525 91856 41125 91152 43 18 34694 93789 56325 93150 37949 92521 39555 91845 41151 91140 42 18 34721 93779 36352 93159 37973 92510 39581 91893 41176 91128 41 2.0 34721 93769 36464 93127 38053 92477 39661 91799 41257 91092 38 2.1 94775 93759 36466 93137 38026 92488 39635 91810 41231 91104 39 2.2 34803 93748 36434 93127 38053 92477 39661 91799 41257 91092 38 2.3 48309 93738 36461 93116 38080 92466 39688 91287 41284 91080 37 2.4 34857 93798 36488 93106 38107 92455 39715 91775 41310 91068 37 2.5 34848 93718 36515 93095 38183 92421 39796 91775 41310 91068 37 2.5 34884 93718 36515 93095 38183 92421 39796 91741 41397 91036 35 2.5 34894 93718 36515 93095 38188 92421 39796 91741 41397 91036 35 2.6 34912 93708 36542 33084 38161 92432 39766 91752 41363 91044 34 2.7 34939 93698 36569 93063 38215 92410 39822 91729 41416 91020 33 2.8 34966 93688 36596 93063 38215 92410 39822 91729 41416 91020 33 2.9 34999 93677 36623 93052 38241 92399 3848 91718 41449 91008 37 2.9 34993 93677 36623 93052 38241 93399 39848 91718 41449 91008 37 2.9 34909 93677 36623 93052 38241 93399 39848 91718 41449 91008 37 2.9 34909 93677 36623 93052 38241 93399 39848 91718 41449 91008 37 2.9 34909 93677 36623 93052 38241 93399 39848 91718 41449 91008 37 2.9 34909 93677 36623 93052 38241 93399 39848 91718 41449 91008 37 2.9 34909 35677 36677 93031 38295 92277 39900 91694 41496 90996 32 2.9 3575 93647 36704 93020 38392 92277 39900 91694 41496 90996 32 2.9 34959 3566 93688 93898 93898 93898 91683 41592 90090 91694 41499 90090 91694 41499 90090 91694 41499 90090 91694 41499 90090 91694 41499 90090 91694 41499 90090 91694 41499 90090 91694 41499 90090 91694 41499 90090 91694 41499 90090 91694 91494 91494 91494   | 10   |          |         |       |        |          |          |          |         |                  |       |      |
| 13   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 14   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 15         34612         96819         36244         9901         37865         92543         39701         91876         41072         91176         44           17         34666         93799         96298         93180         37919         92533         39501         91856         411925         91152         43           1.8         34694         93789         96298         93180         37919         92532         39528         91856         41125         91140         42           1.9         34721         98779         96352         93189         93737         92510         39581         91833         41178         91140         42           2.0         34748         93769         96379         93148         37999         92499         39608         91842         41204         91116         40           2.1         34775         93789         36464         93167         38026         92488         39635         91811         911799         41237         91092         38           2.3         34830         93748         36457         99312         3816         92466         99688         91779         41263         91068         36   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 16 34639 93809 95271 93190 37892 92543 39501 91868 41028 91152 43 184 194 93789 96325 93169 37919 92532 39598 91865 41195 91152 43 184 194 93789 96325 93169 37919 92532 39555 91845 41151 91140 42 194 194 194 194 194 194 194 194 194 194  |      |          |         |       |        |          |          |          |         |                  |       |      |
| 17   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 18   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 1-9    3472    93779   36352   93159   37973   92510   39581   91833   41178   91128   41  |      |          |         |       |        |          |          |          |         |                  |       |      |
| 200   34748   93769   36379   93148   37999   92499   39608   91822   41204   91116   40   |      |          |         |       |        |          |          |          |         |                  | 1     |      |
| 21         34775         93755         36406         93137         38026         92488         39655         91810         41251         91104         39           23         34830         93738         36461         93116         38080         92466         39688         91787         41284         91080         38           24         34857         93728         36488         93106         38107         92455         39715         91764         41330         91088         36           25         34849         93718         36542         93084         38161         92432         39768         19764         41337         91036         35           26         34912         93708         36569         93074         38188         92421         39795         91741         41390         91032         3           28         34966         93688         36596         93074         38188         92421         39795         91741         41390         91032         3           30         35021         93667         36673         36673         38241         92399         93875         91704         41469         90964         30         934  |      |          |         | ·     |        | <u> </u> | <u> </u> | <b></b>  |         |                  |       | -    |
| 292         34803         93748         56434         93197         38053         92476         39661         91799         41257         91092         38           24         34857         93728         36481         93106         38107         92455         39715         91757         41310         91080         35           25         34884         93718         36515         98095         38134         92444         39741         91764         41337         91036         35           26         34912         93708         36559         93084         38161         92432         39768         91752         41363         91040         34           27         34939         3668         36596         93063         38215         92410         39822         91729         41416         91000         32           29         34993         3667         36650         93042         38288         92387         91706         41469         9096         30           31         35048         93657         36731         38295         92377         39902         91694         41496         9096         30           31         35048         93657<   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 23         34850         93738         36461         93116         38080         92465         39688         91787         41284         91080         37           24         34857         93728         36518         93006         38134         92444         39741         91764         41307         91036         35           26         34912         93708         38542         93084         38161         92432         39768         91752         41363         91044         34           28         34966         93688         36569         93063         38215         92410         39822         91729         41466         91020         32           29         34993         93677         36623         93052         38215         92410         39825         91706         41469         9000         3           30         35021         33667         36620         93042         38268         92387         9975         91761         41469         90906         3           31         35048         93657         36677         93031         38295         92377         39902         91694         41496         90944         44           43 </td <td></td>  |      |          |         |       |        |          |          |          |         |                  |       |      |
| 24         34857         93728         36488         93106         38107         92455         93715         91715         41310         91068         36           25         34912         93708         36515         98095         38161         92432         39768         91752         41363         91044         34           27         34939         93698         36569         93074         38181         92421         39795         91741         41390         91032         33           29         34996         93667         36623         93052         38241         92399         93848         91718         4146         91020         33           30         35021         93667         36650         93042         38268         92388         39875         91706         41466         91008         31           31         35048         93667         36677         93031         38295         92367         91706         41496         90960         30           31         35048         93657         36731         93010         38349         92355         99855         91671         41496         90948         26           34         3515   |      |          |         |       |        |          | ľ        |          |         |                  |       |      |
| 25 34884 93718 36515 93095 38134 92444 39741 91764 41337 91056 35 26 34912 93708 36542 93084 38161 92432 39768 91752 41363 91044 31 27 34939 93698 36569 93074 38188 92491 39795 91741 41390 91032 33 29 34993 93677 36623 93052 38241 92399 39848 91718 4146 91030 32 29 34993 93677 36623 93052 38241 92399 39848 91718 4146 91030 32 29 34993 93677 36623 93052 38241 92399 39848 91718 41443 91008 31 35048 93657 36650 93042 38268 92387 39902 91694 41496 90994 29 35 35075 93647 36704 93020 38322 92366 39928 91683 41522 90972 28 35075 93647 36704 93020 38322 92366 39928 91683 41522 90972 28 35075 93647 36704 93020 38322 92366 39928 91683 41522 90972 28 355 35157 93616 36785 92999 38376 92343 39982 91660 41575 90948 26 36788 92999 38376 92343 39982 91660 41575 90948 26 36786 92988 38403 92332 40008 91648 41602 90936 25 36 35187 93616 36785 92988 38403 92332 40036 91648 41602 90936 25 36 35187 93516 36867 92956 38483 92391 40035 91636 41629 90924 24 38 35239 93585 36867 92956 38483 92391 40035 91636 41629 90924 24 38 35239 93585 36867 92956 38483 92299 40088 91613 41681 90999 22 39 35266 93575 36949 92945 38510 92287 40115 91601 41707 90887 21 41 35320 93555 36949 92945 38510 92287 40115 91601 41707 90887 21 41 35320 93555 36948 92994 38564 92285 40115 91601 41707 90887 21 41 35320 93555 36948 92992 38617 92243 40221 91555 41813 90889 17 44 35402 93524 37029 92892 38617 92243 40221 91555 41813 90889 17 44 35402 93524 37029 92892 38617 92243 40221 91555 41813 90889 17 44 35402 93524 37029 92881 38671 92243 40221 91555 41813 90889 17 44 35402 93524 37029 92882 38644 92221 40248 91543 41840 90826 16 3646 93503 37083 92870 38698 92209 40301 91519 41892 90080 14 45 35429 93514 37056 92881 38671 92243 40221 91555 41813 90889 17 54 35538 93492 37110 92857 38898 92107 40348 91543 41840 90856 16 355429 93514 37056 92881 38671 92243 40221 91555 41813 90899 17 54 35538 93492 37110 92857 38893 92107 40348 91543 41840 90856 16 355429 93514 37056 92878 38886 92190 40368 91578 41849 90778 12 55 35619 93441 37249 92865 38859 92114 40461 914   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 26         34912         93708         36542         93044         38161         92492         39768         91752         41363         91044         34           27         34939         93698         36569         93063         38215         92410         39322         91729         41416         91020         32           29         34993         93677         36623         93052         38241         92399         39848         91718         41443         91008         31           30         35021         93667         36650         93042         38268         92388         39875         91706         41469         90969         30           31         35048         93657         36677         93031         38295         92387         39002         91694         41469         90984         29           92         35075         93647         36704         39000         38349         92355         91671         41549         90960         27           34         35130         93637         36731         93010         38349         92353         39082         91660         41579         90948         29           35         351   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 27         34996         93698         36569         93074         38188         92421         39795         91741         41390         91032         33           28         34966         93688         36596         93063         38215         92410         39822         91729         41416         91008         31           30         35021         93667         36630         93042         38268         92388         39875         91706         41496         90984         29           31         35048         93657         36677         93031         38295         92377         39902         91694         41496         90984         29           32         35075         93647         36704         93020         38322         92366         39928         91683         41529         90972         28           33         35102         93637         36731         93016         38499         92355         99555         91671         41549         90906         7           34         35137         93616         36785         92998         38430         92355         99664         41622         90934         24           35         3512   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 28         34966         95688         36596         93063         38215         92410         39822         91729         41416         91020         31           29         34993         93677         36623         93052         38241         92399         39848         91718         41443         91008         31           30         35048         93657         36677         93031         38295         92377         3902         91694         41496         90984         29           32         35075         93647         36731         93010         38349         92355         39928         91683         41522         90972         28           34         35130         93616         36785         92999         38376         92333         39982         91660         41575         90948         28           36         35157         93616         36785         92998         38430         92323         40008         91648         41602         90936         25           36         35211         93596         36839         92967         38436         92310         40035         91636         41651         90911         23           3   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 29   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 91       35048       93657       36677       93031       38295       92377       99902       91694       41496       90984       29         92       35075       93647       36731       93010       38322       92366       99928       91671       41522       90972       28         34       35130       93626       36758       92999       98876       92343       39982       91660       41575       90948       26         36       35184       93606       36812       92988       38403       92321       40035       91636       41628       90924       24         37       35211       93596       36839       92967       38430       92321       40035       91635       41628       90924       24         38       35239       93585       36867       92956       38483       92299       40088       91613       41681       90e92       22         39       35266       93575       36894       92945       38510       92287       40115       91601       41707       90887       21         40       35293       93565       36948       92943       38537       92276       40141   |      |          |         |       |        |          |          |          |         |                  |       |      |
| S1       35048       93657       36677       93031       38295       92377       89902       91694       41496       90984       29         32       35075       93647       36704       29020       38322       92365       39928       91671       41522       90972       28         34       35130       93626       36758       92999       38376       92343       39982       91660       41575       90948       26         36       35157       93616       36785       92998       38403       92321       40035       91636       41628       90924       24         36       35211       93596       36839       92967       38456       92310       40062       91635       41628       90924       24         38       35239       93585       36867       92956       38483       92299       40088       91613       41681       90892       22         39       35266       93575       36894       92945       38510       92287       40115       91601       41707       90887       21         40       35293       93565       36948       92945       38537       92276       40141   | .30  | 35021    | 93667   | 36650 | 93042  | 38268    | 92388    | 39875    | 91706   | 41469            | 90996 | 30   |
| 92         3507.5         93647         36704         93020         38322         92366         39928         91683         41522         90972         28           33         35102         93637         36731         93010         38349         92355         39955         91671         41549         90960         28           34         35130         93626         36785         92998         38403         92321         40008         91648         41602         90936         25           36         35184         93606         36812         92978         38430         92311         40035         91636         41628         90924         24           37         35211         93596         36839         92967         38456         92310         40062         91636         41631         90924         24           38         35289         93585         36867         92956         38483         92297         40082         91630         41734         90875         20           40         35293         93565         36941         92935         38537         92267         40115         91601         41707         90875         20 <th< td=""><td></td><td>35048</td><td></td><td></td><td></td><td>38295</td><td>92377</td><td></td><td></td><td>41496</td><td>90984</td><td>29</td></th<>  |      | 35048    |         |       |        | 38295    | 92377    |          |         | 41496            | 90984 | 29   |
| 84         35130         98626         36758         92999         38376         92343         39982         91660         41575         90948         26           35         35157         93616         36785         92988         38403         92332         40008         91648         41602         90936         25           36         35184         93606         36819         92967         38430         92321         40035         91636         41628         90924         24           37         35293         93585         36867         92956         38483         92299         40088         91613         41681         90699         22           39         35266         93575         36894         92945         38510         92287         40115         91601         41707         90887         21           40         35293         93555         36948         92924         38564         92265         40141         91590         41734         90875         20           41         35320         93554         36702         92913         38510         92265         40141         91590         41734         90875         20  |      | 35075    |         | 36704 | 93020  | 38322    | 92366    | 39928    | 91683   | 41522            | 90972 |      |
| 35         35157         93616         36785         92988         38403         92332         40008         91648         41602         90936         25           36         ,36184         93606         36812         92978         38430         92321         40035         91636         41628         90924         24           37         35211         93596         36839         92967         38456         92310         40062         91625         41655         90911         23           38         35239         93585         36867         92956         38483         92299         40088         91613         41681         90699         22           39         35266         93575         36894         92945         38510         92287         40115         91601         41707         90887         21           40         35293         93565         36948         92924         38544         92265         40168         91578         41760         90863         19           42         35347         93544         36975         92913         38591         92254         40185         91566         41787         90861         18 <td< td=""><td>, 33</td><td>35102</td><td>93637</td><td>36731</td><td>93010</td><td>38349</td><td>92355</td><td>39955</td><td>91671</td><td>41549</td><td>90960</td><td></td></td<>   | , 33 | 35102    | 93637   | 36731 | 93010  | 38349    | 92355    | 39955    | 91671   | 41549            | 90960 |      |
| 36         .36184         93606         36812         92978         38430         92321         40035         91636         41628         90924         24           37         35211         93596         36839         92967         38456         92310         40062         91625         41655         90911         23           38         35239         93585         36867         92956         38483         92299         40088         91613         41681         90899         22           39         35266         93575         36894         92945         38510         92287         40115         91601         41707         90887         21           40         35293         93565         36948         92994         38564         92265         40168         91578         41760         90863         19           42         35347         93544         36975         92913         38591         92254         40195         91566         41787         90851         18           43         35375         93534         37002         92802         38647         92231         40248         91545         41810         90802         14 <td< td=""><td></td><td></td><td>93626</td><td></td><td></td><td></td><td></td><td></td><td>91660</td><td></td><td></td><td></td></td<>   |      |          | 93626   |       |        |          |          |          | 91660   |                  |       |      |
| 37         35211         93596         36839         92967         38456         92310         40062         91625         41655         90911         28           38         35239         93585         36867         92956         38483         92299         40088         91613         41681         90699         22           39         35266         93575         36894         92945         38510         92287         40115         91601         41707         90887         21           40         35293         93565         36948         92924         38564         92267         40141         91590         41734         90875         20           41         35302         93544         36975         92913         38591         92254         40195         91566         41787         90851         18           43         35375         93544         37029         92892         38644         92231         40248         91543         41840         90820         16           45         35429         93514         37056         92881         38671         92220         40275         91531         41866         90820         14  |      |          |         |       |        |          |          |          |         |                  |       |      |
| 38         35239         93585         36867         92956         38483         92299         40088         91613         41681         90e99         22           39         35266         93575         36894         92945         38510         92287         40115         91601         41707         90887         21           40         35293         93565         36921         92935         38537         92276         40141         91590         41734         90875         20           41         35320         93555         36948         92992         38564         92265         40168         91578         41760         90863         19           42         35347         93544         36075         92913         38591         92254         40195         91566         41787         90861         18           43         35402         93524         37029         92892         38644         92231         40248         91543         41840         90826         16           45         35429         93514         37056         92881         38671         92220         40275         91531         41860         90814         15  |      |          |         |       |        |          |          |          |         |                  |       |      |
| 39         35266         93575         36894         92945         38510         92287         40115         91601         41707         90887         21           40         35293         93565         36948         92924         38564         92265         40168         91578         41760         90863         19           41         35320         93555         36948         92924         38564         92265         40168         91578         41760         90863         19           42         35347         93544         36975         92902         38617         92243         40221         91555         41813         90839         17           44         35402         93524         37029         92882         38644         92231         40221         91555         41813         90839         17           45         35429         93514         37056         92881         38671         92220         40275         91531         41866         90814         15         46         96456         93503         37083         92875         92186         40355         91508         41919         90790         13         48         35511         93483   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 40 35293 93565 96921 92935 38537 92276 40141 91590 41734 90875 20 41 35320 93555 36948 92994 38564 92265 40168 91578 41760 90863 19 42 35347 93544 36975 92913 38591 92254 40195 91566 41787 90851 18 43 35375 93534 37002 92902 38617 92243 40221 91555 41813 90839 17 44 35402 93524 37029 92892 38644 92231 40248 91543 41840 90826 16 45 35429 93514 37056 92881 38671 92220 40275 91531 41866 90814 15 46 36456 93503 37083 92870 38698 92209 40301 91519 41892 90802 14 47 35484 93493 37110 92859 38725 92198 40238 91508 41919 90790 13 48 35511 93483 37137 92849 38752 92186 40355 91496 41945 90778 12 49 35538 93472 37164 92838 38778 92175 40381 91484 41972 90766 11  50 35565 93462 37191 92827 38805 92164 40408 91472 41998 90753 10 51 35592 93452 37218 92816 38832 92152 40434 91461 42024 90741 9 52 35619 93441 37245 92805 38859 92141 40461 91449 42051 90729 8 53 35647 93431 37272 92794 38866 92130 40488 91437 42077 90717 7 54 35674 93420 37299 92784 38912 92119 40514 91425 42104 90704 6 55 35701 93410 37326 92773 38939 92107 40541 91414 42130 90692 5 56 36728 93400 37353 92762 38966 92096 40567 91402 42156 90680 4 57 35782 93379 37407 92740 39020 92073 40521 91378 42209 90655 2 59 35810 93368 37134 92729 92946 92066 40567 91402 42156 90680 4 58 35837 93358 37461 92718 39073 82050 40674 91355 42269 90031 0  N. cos. N. sine, Nin.  |      |          |         |       |        |          |          |          |         |                  |       |      |
| 41   35320   93555   36948   92924   38564   92265   40168   91576   41760   90863   19 42   35347   93544   36975   92913   38591   92254   40195   91566   41787   90851   18 43   35375   93534   37002   92902   38617   92243   40221   91555   41813   90839   17 44   35402   93524   37029   92882   38644   92231   40248   91548   41840   90826   16 45   35429   93514   37056   92881   38671   92200   40275   91531   41866   90814   15 46   96456   93503   37083   92870   38698   92209   40301   91519   41892   90802   14 47   35484   93493   37110   92859   38725   92186   40335   91508   41919   90790   13 48   35511   93483   37137   92849   38752   92186   40355   91496   41945   90778   12 49   35538   93472   37164   92838   38778   92175   40381   91484   41972   90766   11  50   35565   93462   37191   92827   38805   92164   40408   91472   41998   90733   10 51   35592   93452   37218   92816   38832   92152   40434   91461   42024   90741   9 52   35619   93441   37245   92805   38859   92141   40461   91449   42051   90729   8 53   35647   93420   37299   92784   38912   92119   40514   91425   42104   90704   6 55   35701   93410   37326   92773   38939   92107   40541   91414   42130   90692   5 56   36728   93400   37353   92762   38966   92096   40567   91402   42156   90680   4 57   35755   93389   37380   92751   38993   92085   40594   91390   42183   90668   3 58   35782   93379   37407   92740   38902   92073   40621   91378   42209   90655   2 59   35810   93368   37134   92729   39046   92062   40647   91366   42235   90643   1 60   35837   93358   37461   92718   39073   82050   40674   91365   42262   90031   0  N. cos.   N. sine   N   |      |          |         | 36894 |        |          |          |          | 91601   | <u> </u>         |       |      |
| 42         35347         93544         86975         92913         38591         92254         40195         91566         41787         90851         18           43         35375         93534         37002         92902         38617         92243         40221         91555         41813         90839         17           44         35402         93514         37056         92881         38671         92220         40275         91531         41860         90814         15           46         36456         93503         37083         92870         38698         92209         40301         91519         41892         90802         14           47         35484         93493         37110         92859         38725         92186         40355         91496         41945         9070         13           48         35511         93483         37110         92859         38725         92186         40355         91496         41945         9070         13           49         35538         93472         37164         92838         38778         92175         4038         91484         41945         90766         11           50<   |      |          |         |       |        |          | •        |          |         |                  |       |      |
| 43   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 44         35402         93524         37029         92892         38644         92231         40248         91548         41840         90826         16           45         35429         93514         37056         92881         38671         92200         40275         91531         41866         90814         15           46         96456         93503         37083         92870         38698         92209         40301         91519         41892         90802         14           47         35484         93493         37110         92859         38725         92198         40355         91496         41945         90778         12           49         35538         93472         37164         92838         38778         92175         40381         91484         41972         90766         11           50         35565         93462         37191         92827         38805         92164         40408         91472         41998         90753         10           51         35567         93461         37245         92806         38839         92152         40434         91461         42024         90741         9           5   |      |          |         |       |        |          | ł .      |          |         |                  |       |      |
| 45   35429   93514   37056   92881   38671   92220   40275   91531   41866   90814   15 46   36456   93503   37083   92870   38698   92209   40301   91519   41892   90802   14 47   35484   93493   37110   92859   38725   92186   40328   91508   41919   90790   13 48   35511   93483   37137   92849   38752   92186   40335   91496   41945   90778   12 49   35538   93472   37164   92838   38778   92175   40381   91484   41972   90766   11  50   35565   93462   37191   92827   38805   92164   40408   91472   41998   90753   10 51   35592   93452   37218   92816   38832   92152   40434   91461   42024   90741   9 52   35619   93441   37245   92805   38859   92141   40461   91449   42051   90729   8 53   35647   93431   37272   92794   38886   92130   40488   91474   42130   90729   8 53   35674   93420   37299   92784   38912   92119   40514   91425   42104   90704   6 55   35701   93410   37326   92773   38939   92107   40541   91414   42130   90692   5 56   36728   93400   37353   92762   38966   92096   40567   91402   42156   90680   4 57   35755   93389   37380   92751   38993   92085   40594   91390   42183   90668   3 58   35782   93379   37407   92740   389020   92073   40621   91378   42209   90655   2 59   35810   93368   37134   92729   39046   92062   40647   91366   42235   90643   1 60   35837   93358   37461   92718   39073   \$2050   40674   91355   42262   90031   0  N. cos.   N. sine.   N. cos.   N. sine.   N. cos.   N. sine.   N. cos.   N. sine   Min.  |      |          |         |       |        |          |          |          |         |                  |       |      |
| 46         96456         93503         37083         92870         38698         92209         40301         91519         41892         90802         14           47         35484         93493         37110         92859         38725         92198         40328         91508         41919         90700         13           48         35511         93483         37137         92849         38752         92186         40355         91496         41945         90778         12           49         35538         93472         37164         92838         38778         92175         40381         91484         41972         90766         11           50         35565         93462         37191         92827         38805         92164         40408         91472         41998         90753         10           51         35592         93452         37218         92816         38832         92152         40434         91461         42024         90741         9           52         35619         93441         37245         92805         38859         92141         40461         91449         42051         90729         8           53   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 47         35484         93493         37110         92859         38725         92198         40328         91508         41919         90790         13           48         35511         93483         37164         92849         38752         92186         40355         91496         41945         90778         12           49         35538         93472         37164         92838         38778         92175         40381         91484         41972         90766         11           50         35565         93462         37191         92827.         38805         92164         40408         91472         41998         90753         10           51         35592         93452         37218         92816         38832         92152         40434         91461         42024         90741         9           52         35619         93441         37245         92805         38859         92141         40461         91449         42051         90729         8           53         35647         93420         37299         92784         38912         92130         40488         91437         42077         90717         7           54   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 48   35511   93483   37137   92849   38752   92186   40355   91496   41945   90778   12 49   35538   93472   37164   92838   38778   92175   40381   91484   41972   90766   11  |      |          |         |       |        |          |          |          |         |                  |       |      |
| 49         35538         93472         37164         92838         38778         92175         40381         91484         41972         90766         11           50         35565         93462         37191         92827         38805         92164         40408         91472         41998         90753         10           51         35592         93452         37218         92816         38832         92152         40434         91461         42024         90741         9           52         35619         93441         37245         92805         38859         92141         40461         91494         42051         90729         8           53         35647         93431         37272         92794         38866         92130         40488         91437         42077         90717         7           54         35674         93420         37326         92773         38939         92107         40541         91425         42104         90704         6         55         35701         93410         37326         92773         38939         92107         40541         91414         42130         90692         5         56         36728  |      |          |         |       |        |          | 1        |          |         |                  |       |      |
| 51         35592         93452         37218         92816         38832         92152         40434         91461         42024         90741         9           52         35619         93441         37245         92805         38859         92141         40461         91494         42051         90729         8           53         35647         93431         37272         92794         38866         92130         40488         91437         42077         90717         7           54         35674         93420         37299         92784         38912         92119         40514         91425         42104         90704         6           55         35701         93410         37326         92773         38939         92107         40541         91414         42130         90692         5           56         36728         93400         37353         92752         38966         92096         40567         91402         42185         90680         4           57         35755         93389         37380         92751         38993         92085         40594         91390         42183         9068         3           58   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 51         35592         93452         37218         92816         38832         92152         40434         91461         42024         90741         9           52         35619         93441         37245         92805         38859         92141         40461         91494         42051         90729         8           53         35647         93431         37272         92794         38886         92130         40488         91437         42077         90717         7           54         35674         93420         37299         92784         38912         92119         40514         91425         42104         90704         6           55         35701         93410         37326         92773         38939         92107         40541         91414         42130         90692         5           56         36728         93400         37353         92752         38966         92096         40567         91402         42186         90680         4           57         35755         93389         37380         92751         38993         92085         40594         91390         42183         9068         3           58   | 50   | 35565    | 93462   | 37191 | 92827. | 38805    | 92164    | 40408    | 91472   | 41998            | 90753 | 10   |
| 52         35619         93441         37245         92805         38859         92141         40461         91449         42051         90729         8           53         35647         93431         37272         92794         38886         92130         40488         91437         42077         90717         7           54         35674         93420         37299         92784         38912         92119         40514         91425         42104         90704         6           55         35701         93410         37326         92773         38939         92107         40541         91414         42130         90692         5           56         36728         93400         37353         92762         38966         92096         40567         91402         42186         90692         5           57         35755         93389         37380         92751         38993         92085         40567         91402         42183         90680         4           58         35782         93379         37407         92740         39020         92073         40621         91378         42209         90655         2         59         35810<   |      | 35592    |         |       |        |          |          |          |         |                  |       |      |
| 53         35647         93431         37272         92794         38886         92130         40488         91437         42077         90717         7           54         35674         93420         37299         92784         38912         92119         40514         91425         42104         90704         6           55         35701         93410         37386         92773         38939         92107         40541         91414         42130         90692         5           56         36728         93400         37350         92762         38966         92096         40547         91402         42156         90680         4           57         35755         93389         37380         92751         38993         92085         4054         91390         42183         90668         3           58         35782         93379         37407         92740         39020         92073         40621         91378         42209         90655         2           59         35810         93368         37461         92718         39073         82050         40647         91366         42235         90643         1           60   | 52   | 35619    |         |       |        |          |          |          |         | 42051            |       |      |
| 54         35674         93420         37299         92784         38912         92119         40514         91425         42104         90704         6           55         35701         93410         37326         92773         38939         92107         40541         91414         42130         90692         5           56         36728         93400         37353         92762         38966         92096         40567         91402         42156         90680         4           57         35755         93389         37380         92751         38993         92085         40594         91390         42183         90668         3           58         35782         93379         37407         92740         39020         92073         40621         91378         42209         90655         2           59         35810         93368         37134         92729         39046         92062         40647         91366         42235         90643         1           60         35837         93358         37461         92718         39073         82050         40674         91365         42262         90631         0           N. cos.   |      | 35647    |         |       |        |          |          |          |         | 42077            | 90717 |      |
| 56         36728         93400         37353         92762         38966         92096         40567         91402         42156         90680         4           57         35755         93389         37380         92751         38993         92085         40594         91390         42183         90668         3           58         35782         99379         37407         92740         39020         92073         40621         91378         42209         90655         2           59         35810         93368         37461         92718         39073         92050         40674         91366         42235         90643         1           60         35837         93358         37461         92718         39073         92050         40674         91355         42262         90631         O           N. cos.         N. sinc.         N. sinc.         N. cos.         N. sinc.         N. cos.         N. sinc.         N. cos.         N. sinc.   |      |          | 93420   |       |        |          | 92119    |          |         |                  |       |      |
| 57         35755         93389         37380         92751         38993         92085         40594         91390         42183         90668         3           58         35782         93379         37407         92740         39020         92073         40621         91378         42209         90655         2           59         35810         93368         37134         92729         39046         92062         40647         91366         42235         90643         1           60         35837         93358         37461         92718         39073         \$2050         40674         91355         42262         90631         O           N. cos.         N. sîne.         N. cos.         N. sine.         N. sine.         N. cos.         N. cos.         N. cos.         N. cos.         N. cos.         N. cos   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 58         35782         93379         37407         92740         39020         92073         40621         91378         42209         90655         2           59         35810         93368         37134         92729         39046         92062         40647         91366         42235         90643         1           60         35837         93358         37461         92718         39073         N2050         40674         91355         42262         90631         0           N. cos.         N. sine.         Min.   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 59 35810 93368 97134 92729 39046 92062 40647 91366 42235 90643 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |      |          |         |       |        |          |          |          |         |                  |       |      |
| 60 35837 93358 37461 92718 39073 \$2050 40674 91355 42262 90631 O  N. cos.   N. sine.   Min.  |      |          |         |       |        |          |          |          |         |                  |       |      |
| N. cos. N. sine. Min.  |      |          |         |       |        |          |          |          |         |                  |       |      |
|  |      |          |         |       |        |          |          |          |         |                  |       |      |
| 690 680 670 660  |      |          |         |       |        |          |          |          |         |                  |       | Min. |
|  |      | 69       | 30      | 68    | 10     | 67       | 0        | 60       | 0       | 65               | o (   |      |

| No.    |      | 1 6     | .50     |          | 20      |          | 70        |          | 280     |          | 290           | <del></del> |
|--|------|---------|---------|----------|---------|----------|-----------|----------|---------|----------|---------------|-------------|
| 1  | 3.5. |         |         | '        |         |          |           |          |         |          | -             |             |
| 1 49288 9618 46863 89867 45495 89087 46999 88291 48506 87484 58 3 49241 90594 43916 89841 45471 89061 47044 88297 48593 87484 58 5 49294 90569 43968 89816 45593 89048 47050 88290 48585 87406 56 6 49240 90567 43994 89803 45554 89919 47101 88191 48659 87397 56 6 49240 90567 44098 89790 45696 8908 47127 88193 48659 87395 53 8 49473 90592 44072 89764 45696 8996 47153 88185 48675 87395 51 10 42525 90507 44098 89762 45688 88968 47293 88185 48675 87395 51 11 42527 90495 41124 89739 45684 88955 47299 88117 48817 48710 87305 51 11 42528 90495 41178 89716 45694 88955 47299 88117 48817 48716 87306 8908 47197 8719 8719 8719 8719 8719 8719 8719  | win. | N. sine | N. cos. | N. sine. | N. cos. | N. sine  | . N. cos. | N. sine  | N. cos. | N. sine  | N. COS        | • [         |
| 1 49288 9618 46863 89867 45495 89087 46999 88291 48506 87484 58 3 49241 90594 43916 89841 45471 89061 47044 88297 48593 87484 58 5 49294 90569 43968 89816 45593 89048 47050 88290 48585 87406 56 6 49240 90567 43994 89803 45554 89919 47101 88191 48659 87397 56 6 49240 90567 44098 89790 45696 8908 47127 88193 48659 87395 53 8 49473 90592 44072 89764 45696 8996 47153 88185 48675 87395 51 10 42525 90507 44098 89762 45688 88968 47293 88185 48675 87395 51 11 42527 90495 41124 89739 45684 88955 47299 88117 48817 48710 87305 51 11 42528 90495 41178 89716 45694 88955 47299 88117 48817 48716 87306 8908 47197 8719 8719 8719 8719 8719 8719 8719  | 0    | 42262   | 90631   | 43837    | 89879   | 45999    | 89101     | 46947    | 88995   | 48481    | 87469         | 60          |
| 2 42315 90506 43889 88854 45451 89074 46999 88267 48539 87484 58 3 42947 90594 39042 88988 45503 89048 47050 88940 48583 87406 56 5 42959 90507 49088 89867 45599 8935 47076 88996 48608 87391 65 6 49490 905507 43994 88963 45593 8935 47076 88996 48608 87391 65 8 49479 90502 440046 89777 45606 88995 41137 88197 48634 87377 54 8 49479 90502 44046 89777 45606 88995 41138 88194 88634 87397 54 10 42952 90507 44098 89754 45639 88981 47138 88172 48684 87395 52 11 42552 90507 44098 89752 45638 88981 47138 88172 48671 87395 51 12 42778 90483 41151 89726 45710 88494 47255 88199 48676 87399 52 11 42552 90407 49177 89713 45678 88958 47294 88158 48766 87399 69 12 42778 90483 41415 89726 45710 88494 47255 88190 48676 87390 69 13 42604 90470 49177 89713 45796 88994 47255 88190 48676 87390 69 14 42635 90458 44038 89700 45792 8815 47906 88193 88692 87292 4816 48676 90487 48491 89759 44759 90481 44151 89726 45792 88154 47255 88103 48867 87294 4759 88144 48761 87278 477470 90491 44981 89662 45839 88873 47368 88075 48869 87225 45 17 42709 90491 44981 89662 45839 88875 47368 88075 48869 87225 45 18 42763 90408 44393 89603 45865 88862 47358 88062 48913 87291 43 19 42762 90306 44333 89603 45894 88855 47408 88062 48913 87291 43 19 42763 90306 44333 89603 45894 88855 47408 88069 4998 87178 40 19 42769 90306 44464 89571 46990 88789 47588 8006 49014 87164 98 19 42769 90306 44468 89469 45865 8860 47414 87893 89040 87150 98 19 42769 90306 44468 89460 46606 88794 47408 88064 49948 87193 41 20 42788 903071 44498 89546 46070 88789 47586 87951 49116 87097 87186 47789 87186 4778 87186 4779 871 |      |         |         |          |         |          | 1         |          |         |          |               |             |
| 3 42941 90.594 43916 89841 44.573 89061 47024 882.54 48.557 87420 57 4 4295 90.585 39.68 89.61 45.593 890.84 47050 882.90 48.886 873.91 65 6 4249.0 90.557 439.94 898.03 7 42444 90.545 440.00 897.07 45.506 889.95 471.53 881.91 48.55 873.97 1 9 4249 90.502 440.04 897.77 45.606 889.95 471.53 881.95 48.65 873.95 1 10 4252.9 90.507 440.98 897.52 45.652 888.81 471.78 881.79 48.75 873.95 1 11 4252.9 90.040 441.71 897.63 45.606 889.95 471.53 881.54 48.75 873.95 1 12 4257.9 90.49 41.11 897.65 45.70 88.40 471.78 881.79 487.56 873.95 1 13 4250.9 90.49 41.17 897.13 45.73 88.80 471.79 881.79 487.66 873.96 873. |      | 1       |         |          |         |          | ,         |          |         |          |               |             |
| 4 42967 90.582 43942 89828 45.503 89048 47050 88240 48888 87406 56 5 42394 90.569 43086 89816 45.529 80.536 47076 88296 48608 87391 65 6 42440 90.567 43994 89803 45.554 89.201 47101 88213 48634 87397 54 7 42446 90.545 44020 88790 44.556 88996 47127 88199 48655 87368 53 8 42473 90.502 44046 89777 46.5692 88991 47178 88185 48684 87349 52 9 42499 90.520 44072 89764 45606 88995 47153 88185 48684 87349 52 10 42575 90.507 44098 897.52 45658 89968 47204 88158 48735 87381 50 11 425.52 90.695 44124 89739 45684 88955 47229 88144 48761 87396 49 12 42578 90.833 44151 89726 45710 88342 47255 88190 48786 67299 48 13 42604 90.470 44177 89713 45736 88928 47281 88117 48811 87278 47 14 42631 90.458 44030 89700 45762 8915 47306 88103 48873 87264 46 15 42657 90.446 44229 89687 45782 8916 47368 8873 8809 48862 87250 45 16 42683 90.433 44255 89674 45818 88848 47358 88052 48913 87224 46 16 42683 90.433 44027 89649 45885 88742 47409 88084 48986 87235 45 17 42709 90.421 44281 89662 45839 88874 47388 88062 48913 87221 43 18 42736 90.040 44407 89649 45895 88848 47358 88062 48913 87221 43 18 42736 90.040 44407 89649 45895 88848 47358 88062 48913 87231 43 18 42736 90.036 44333 89603 45891 88848 47348 88004 48964 87193 41 12 42815 90.071 44485 89510 45942 8822 47409 88064 48964 87193 41 120 42788 90.838 44411 89587 45968 88808 47511 87993 49040 87160 38 12 42814 90.033 44464 88571 46090 88782 47459 88004 49014 87160 38 12 42815 90.071 44808 88545 46072 88755 47614 87987 49141 87093 34 12 42815 90.071 44808 88545 46072 88755 47614 87987 49141 87093 34 12 42816 90.030 44516 89545 46072 88755 47614 87987 49194 87090 87119 36 13 43077 90.046 44468 88545 46072 88755 47656 87900 49191 87090 31 14 43077 90.046 44668 88545 46072 88755 47614 87987 49141 87093 34 14 4356 90.001 4516 89545 46072 88755 47614 87987 49141 87093 34 14 4357 90.001 4516 89545 46072 88755 47666 87890 49199 87094 87100 38 14 4356 90.001 4516 89545 46072 88755 47669 87890 49199 87094 87100 38 14 4356 90.001 4516 89545 46072 88755 47669 87892 47499 88064 49199 87094 87100 38 14 |      | 1 -     |         |          |         |          |           |          |         |          |               |             |
| 5         42994         90.556         43968         88816         45.599         890.35         47076         88292         48608         87391         55           7         42446         90.544         4002         89790         45.560         89008         47127         88193         48659         87385         53           8         42473         90.590         44076         89777         45.606         88995         47127         88193         48648         87347         57868         53           10         42925         90.5907         44098         89752         45684         88955         47299         88184         48761         87381         50           11         42559         90495         44151         89764         45710         88942         47253         88144         48761         87381         50           12         42776         90496         44917         89713         45658         88968         47291         88144         48761         87381         50           15         42657         90446         44939         89674         45781         88015         47990         88103         48761         87782         466  |      | _       |         |          |         |          |           |          |         | •        |               | 1           |
| 6 42420 90.557 49.994 88963 45.574 89.91 471.01 88213 48634 8737 54 7 42446 90.5454 40.020 89707 45.560 88998 47127 88199 48655 87368 53 8 42473 90.593 44046 89777 45.666 8899.5 471.53 8819.5 48655 87368 53 10 42499 90.520 44072 89764 45.632 88981 471.53 881.95 48656 87368 52 11 425.52 90.901.5 44124 897.99 45.684 889.5 471.53 881.85 48785 87391 50 11 425.52 90.901.5 44124 897.99 45.684 889.5 47299 881.40 48761 879.66 49 12 425.78 90.483 44151 897.66 45.710 889.2 4729.5 881.50 48766 8729.2 481.13 49.604 90.470 441.77 8971.5 45.710 889.2 4728.1 881.10 4876 8729.2 481.14 42.61 90.45 42.03 8970.0 45.762 8891.5 4730.6 881.0 4876 8729.2 481.14 42.61 90.45 42.03 8970.0 45.762 8891.5 4730.6 881.0 4876 8729.2 46.15 42.683 90.483 442.55 896.74 45.813 888.86 473.5 880.12 4878.7 872.64 41.14 42.61 90.94 42.18 96.62 45.893 888.75 4738.3 880.62 4891.3 872.5 44.14 42.14 42.14 42.15 896.2 45.893 888.75 4738.3 880.62 4891.3 872.5 44.14 42.14 42.15 896.2 45.893 884.4 474.94 880.94 889.9 472.5 48.10 42.14 42.14 42.15 896.2 45.893 888.75 4738.3 880.62 4891.3 872.1 42.14 42.14 42.15 90.856 43.14 42.15 89.15 47.906 880.04 489.04 871.0 42.14 42.14 42.15 42 | 5    |         | 1       |          |         |          |           |          |         |          |               |             |
| 7 42446 99.543 44020 89790 45.656 89008 47127 88199 48659 87588 53 8 42499 90.520 44072 89764 45.656 88989 47132 8819.5 4864 87349 51 1 4259 90.520 44072 89764 45.632 88981 47178 8817.2 48710 87385 51 1 42552 90.495 44124 89793 45.684 88955 47299 881.68 48745 87391 50 1 42578 90.483 44151 89786 45710 88042 47255 8815.0 48766 87292 48 1 42631 90.483 44151 89786 45710 88042 47255 8815.0 48766 87292 48 1 42631 90.483 44151 89786 45710 88042 47255 8815.0 48766 87292 48 1 42631 90.483 44151 89786 45710 88042 47255 8815.0 48766 87292 48 1 42631 90.483 44203 89700 45.762 88915 47306 88103 48877 87292 48 1 42631 90.483 44203 89700 45.762 88915 47306 88103 48877 87292 48 1 42631 90.484 44203 89700 45.762 88915 47306 88103 48877 87294 46 1 42709 90.41 44281 89662 45893 8887.5 47383 88002 489802 87250 45 1 42709 90.41 44281 89662 45893 8887.5 47383 88002 48986 87250 45 1 42709 90.41 44281 89662 45893 8887.5 47383 88002 48918 87291 43 1 42762 90.396 44333 89626 45891 88848 47343 88004 48964 87193 41 1 42762 90.396 44333 89626 45891 88848 47343 88004 48964 87193 41 1 42762 90.396 44437 89584 45.994 88795 47537 87979 90.65 87136 37 1 4222 42841 90.586 44411 89.597 45.996 88084 48989 87178 40 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4   |      |         |         |          |         |          |           |          |         |          |               |             |
| 8 42473 90.532 44046 89.777 45.66 88.95 471.53 8818. 48684 87349 52 94249 90.520 44078 89.764 45.632 889.81 47178 88175 48710 87385 51 1 425.52 90.95 41.24 89.739 45.684 88.95.6 47299 881.64 48751 87306 49 12 42778 90.483 41.51 89789 45.684 88.95.6 47299 881.04 4876 87306 49 12 42778 90.483 41.51 89786 47.70 88.96 47299 881.04 4876 87306 49 14 42.683 90.455 44.933 89700 45.70 45.70 87.05 881.03 4876 87329 48 14.4 42.683 90.455 44.933 89700 45.70 44.583 88.86 472.81 881.07 4876 87329 48 14.4 42.683 90.455 44.933 89700 45.70 45.70 880.94 47.83 89.04 45.70 45.70 880.94 47.83 89.04 45.70 88.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 47.83 89.04 88.83 87.25 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.  |      |         |         |          |         |          |           | •        | 1       |          |               |             |
| 9 42499 90.502 44072 89764 45628 88968 47708 88158 48735 87361 90.0 42525 90.405 44194 89739 45684 8895.5 47299 88144 48761 87392 48736 90.405 44158 89766 45730 8894.2 47255 88130 48786 87392 48734 44251 90.455 44903 89700 45762 8891.5 47906 8810.3 48878 7264 466 42683 90.433 44255 89674 45813 88868 47358 88006 4868 87264 466 42683 90.433 44255 89674 45813 88868 47358 88007 48888 8725 47383 88062 48913 87264 466 42683 90.433 44255 89674 45813 88868 47358 88007 48898 87284 466 42683 90.433 44253 89623 45859 88875 47383 88062 48913 87294 4981 49762 90.506 44393 89623 45859 88862 47499 88048 48936 8729.0 42784 90.0 42784 9 |      |         |         |          |         |          |           |          |         |          |               |             |
| 10   | 9    |         |         |          |         |          |           |          |         |          |               |             |
| 11 42552 90495 44194 89739 45684 88955 47299 88144 48761 87906 499 12 42578 90483 44151 89796 45710 88942 47255 88130 48786 87392 48 13 42604 90470 44177 89713 45762 88942 47255 88130 48876 87392 48 15 42657 90446 44229 89867 45787 88902 47881 88117 48811 87878 47 16 42683 90433 44255 89674 45813 88886 47358 8805 48865 87235 45 16 42683 90433 44255 89674 45813 88886 47358 88062 48891 87235 45 18 42736 90408 44391 89649 45865 88662 47409 88048 48938 67307 4888 18 42736 90408 44397 89649 45865 88662 47409 88048 48938 67307 4828 19 42762 90396 44433 89663 45891 88848 47449 88044 48968 87393 41 20 42788 90383 44359 89623 45917 88835 47460 88020 48999 87178 40 21 42815 90371 44386 69610 45942 88822 47386 88006 49014 87164 39 22 42841 90358 44411 89597 45968 88808 47318 87993 49040 87150 38 23 42867 90346 44437 89584 45094 88795 47587 8799 49065 87136 37 24 42894 90334 44464 89571 466920 88789 47562 87965 49090 87121 56 25 42946 90309 44516 89542 46072 88755 47614 87937 49116 87107 35 25 42940 90321 44490 89558 46046 88768 47588 87993 49116 87107 35 26 42946 90309 44516 89542 46097 88754 47658 87909 87121 56 27 42977 90296 444568 89519 46123 88724 47665 87909 49121 56 28 42946 90309 44516 89542 46097 88754 47658 87909 87121 56 29 43041 90233 444594 89506 46149 88764 47759 87894 49294 87046 87150 31 30 43051 90259 44620 89493 46175 88701 47716 87882 49242 87086 30 31 43077 90246 444678 89467 46226 88674 47767 87864 49298 87091 33 32 43104 90233 44476 89450 4628 88674 47767 87854 49299 87001 44476 89450 4628 88674 47767 87854 49299 87014 44778 89415 46892 88674 47767 87854 49299 80908 7171 44809 89450 44668 89509 68674 47767 87854 49299 80018 44476 89450 4668 88694 87741 87858 49299 87014 34509 90180 44476 89450 4668 88684 87741 87868 49268 87021 29 39 43025 90071 44698 89450 46650 88684 47741 87743 49495 86696 21 30 43051 90096 44776 89450 4666 88454 48901 87767 49298 86696 22 30 43051 90096 44776 89450 4666 88454 48901 87797 87784 49499 86996 21 34 4313 90095 44958 8936 4666 88454 48901 87797 87784 49499 86690 6 34 4 |      |         | !       | ļ        |         | <u> </u> |           |          | '       | <u>'</u> |               | <u> </u>    |
| 12   1278  |      |         |         |          |         |          | 88968     |          | 1       |          |               |             |
| 13   42604   60470   44177   89718   45796   88998   47281   88117   48811   8728   4736   47366   88103   48857   87864   46683   90433   44255   89674   45813   88862   47393   88085   48862   87255   45683   90433   44281   89662   45839   88865   47383   88062   48888   87235   47467   42709   90421   44281   89662   45839   88875   47383   88062   48913   87221   43836   48363   4   |      |         |         |          |         | 45684    |           |          | 1       |          |               |             |
| 14 42631 90458 44203 89700 45762 68915 47306 88103 48837 87264 4461 42637 90446 44229 89687 45787 88902 47332 88089 48862 87250 45 42709 90421 44281 89662 45839 88887 47338 88067 48913 87221 43 18 42736 90408 44307 89649 45865 88662 47409 88048 48938 67207 42 19 42762 90696 44333 89636 45891 88848 47434 88062 48913 87221 43 19 42762 90696 44333 89636 45891 88848 47439 88048 48936 87207 42 12 42815 90371 44386 89610 45042 88822 47486 88002 48999 87178 40 12 42815 90371 44386 89610 45042 88822 47486 88006 48914 87164 39 22 42841 90358 44411 89597 45968 88808 47511 87993 49040 87150 38 23 42867 90336 44437 89584 45094 88795 47557 87979 49065 87136 37 24 42994 90339 44464 89571 46020 88782 47562 87965 49990 87121 36 25 42940 90309 44516 89545 46072 88782 47562 87965 49990 87121 36 24 42949 90309 44516 89545 46072 88755 47614 87997 49141 87097 34 42972 90296 44542 89539 46178 88755 47614 87997 49141 87097 35 42 42940 90309 44568 89519 46123 88728 47660 87866 49199 87064 32 2 43025 90271 44594 89506 46149 88715 47690 87896 49191 87064 32 3 43077 90246 44646 89480 46218 88688 47741 87868 49299 49021 44594 89506 46149 88715 47690 87896 49191 87064 32 3 43100 90231 44594 89506 46149 88715 47690 87896 49217 87050 31 43077 90246 44678 89467 46226 88674 47767 87864 49268 87021 39 43025 90271 44594 89506 46149 88715 47690 87896 49217 87050 31 43077 90246 44678 89467 46226 88674 47767 87864 49268 87021 39 43180 90208 44728 99414 46678 88684 47741 87866 49268 87021 39 43180 90208 44742 89441 46678 88647 47767 87864 49249 89989 87007 28 434309 90183 44776 89415 46625 88674 47767 87864 49249 89989 87007 28 434309 90183 44756 89394 4668 88593 47990 87701 49448 8991 94494 89399 8939 49467 46694 88647 47869 87999 87707 49446 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 8991 94949 9491 9491   |      |         |         |          |         |          |           |          |         |          |               |             |
| 15   |      |         |         |          |         | 45736    |           |          |         |          |               |             |
| 16   42683   904693   44281   89662   45813   88888   47388   88052   48913   87921   4886   42736   90408   44907   89649   45865   88862   47409   80484   48968   87285   48913   87291   48762   90396   44393   89696   45891   88848   47434   88034   48964   87193   41   42762   90396   44393   89693   45917   88835   47460   88020   48989   87178   40   42781   90373   44385   89610   45942   88824   47468   88006   48918   87164   39   42841   90538   44411   89597   45968   88808   47511   87993   49040   87164   39   42841   90334   44464   89571   46020   88782   47562   87965   49090   87191   36   42920   90321   44459   89534   46072   88755   47614   87937   49141   87093   45946   90309   44516   89546   46072   88756   47676   87993   49166   87079   38   42972   90296   44568   89519   46123   88728   47665   87993   49166   87079   38   49042   44568   89519   46123   88728   47665   87993   49166   87079   39   49052   49164   87053   44626   89480   46175   88715   47690   87896   49217   87050   31   43077   90246   44664   89480   46201   88688   47741   87888   49284   49294   87064   32   43130   90221   44698   89480   46252   88661   47793   87840   49218   87091   928   43164   90233   44672   89467   46252   88667   47767   87854   49293   87001   28   43156   90208   44776   89445   46358   88694   47768   87744   47818   87896   49344   68978   26   43343   90196   44750   89445   46353   88694   47786   87784   49419   86998   27   43235   90171   44802   89467   46363   88566   47791   87784   49419   86998   27   43235   90171   44802   89467   46363   88566   47791   87784   49419   86998   27   43345   90019   44946   89378   46381   88684   47781   87886   49344   86978   26   48341   48340   90190   44750   89445   46353   88667   47785   87794   49414   89570   49574   49415   86994   44568   89574   46576   88666   47793   47714   47869   47868   47764   47868   47764   47868   47764   47868   47764   47868   47764   47868   47764   47868   47764   47868   47764   47764   4   |      |         | 90458   |          | 89700   | 45762    | 88915     | 47306    |         |          |               |             |
| 17   |      |         |         |          |         | 45787    | 88902     |          |         |          |               |             |
| 18   42736   200408   44397   89649   45865   88862   47409   88048   48984   87193   42762   200306   44333   89636   45891   88848   47434   88034   48964   87193   421   42815   90371   44385   89623   45917   88835   47486   88006   49014   87164   38   42841   90338   44411   89597   45968   88808   47511   87993   49040   87136   38   42841   90338   44441   89597   45968   88808   47511   87993   49040   87136   38   42841   90334   44464   89571   46020   88762   47586   87955   47596   47592   90053   44400   80558   46046   88768   47588   87951   4916   87107   35   42946   90309   44516   89545   46072   88755   47614   87937   49141   87093   34   42999   90284   44568   89519   46123   88728   47665   87993   49166   87079   38   42929   90294   44568   89519   46123   88728   47665   87993   49166   87079   32   43025   90271   44594   89506   46149   88715   47690   87886   49217   87050   31   43077   90246   44646   89460   46236   88460   46230   88688   47741   87686   49282   87096   31   43077   90246   44646   89460   46236   88661   47767   87854   49293   87001   28   43104   90293   44672   89467   46226   88674   47767   87468   49293   87001   28   43182   90196   44750   89428   46504   88664   47767   8746   49253   87001   28   43182   90196   44776   89445   46252   88661   47733   87840   49318   86978   25   43285   90164   44776   89445   46363   88634   47848   87812   49369   86964   22   43360   90188   44776   89445   46363   88664   47781   87856   49344   86978   26   43313   90120   44906   89350   46648   88593   47940   87770   49445   86991   44   46346   89450   88533   47940   87770   49445   86991   44   46346   89450   88533   47940   87870   49445   86991   44   46346   89450   88533   47940   87870   49454   86978   26   44546   88776   44546   88776   44546   88776   44546   84546   44546   84546   44546   84546   44546   84546   44546   84546   44546   84546   44546   84546   44546   84546   44546   84546   44546   84546   44546   84546   44546   84546   44   |      |         |         |          |         | 45813    | 88888     |          |         |          |               |             |
| 19   |      | 5       |         |          |         | 45839    |           |          | 1       |          |               |             |
| 20   |      |         |         |          |         | 45865    |           |          |         |          |               |             |
| 21 42815 90371 44385 89610 45942 88822 47486 88006 49014 87164 38 22 42841 90358 44411 89597 45968 88808 47511 87993 49040 87150 38 23 42867 90346 44437 89544 45994 88795 47557 87979 49065 87136 37 37 37 37 37 37 37 37 37 37 37 37 37  | 19   | 42762   | 90396   | 44333    | 89636   | 45891    | 88848     | 47434    | 88034   | 48964    | 87193         | 41          |
| 21 42815 90371 44385 89610 45942 88822 47486 88006 49014 87164 38 22 42841 90358 44411 89597 45968 88808 47511 87993 49040 87150 38 23 42867 90346 44437 89544 45994 88795 47557 87979 49065 87136 37 37 37 37 37 37 37 37 37 37 37 37 37  | 90   | 49789   | 00080   | 44950    | 80693   | 45017    | 99995     | 47460    | . 88090 | 48989    | 87178         | 40          |
| 22 42841 90358 44411 89597 45968 88808 47511 87993 49040 87150 38 23 42867 90346 44437 89584 45994 88795 47557 87979 49065 87136 37 24 42894 90334 44464 89571 46092 88782 47558 87965 49090 87121 36 25 42946 90309 44516 89545 46072 88755 47614 87937 49141 87093 34 27 42972 90296 44548 89532 46097 88741 47639 87923 49116 87007 35 28 42999 90284 44568 89519 46123 88728 47665 87890 49192 87064 32 29 43025 90271 44594 89506 46149 88715 47690 87896 49192 87064 32 30 43051 90293 44662 89493 46175 88701 47716 87882 49242 87036 31 30 43077 90246 44666 89480 46201 88688 47741 87668 49268 87021 29 32 43104 90233 44672 89467 46226 88674 47767 87882 49242 87036 32 33 43130 90221 44698 89454 46252 88661 47793 87840 49318 86993 27 34 43165 90208 44724 89441 46278 88647 47848 87864 49218 86993 27 34 43156 90168 44750 89428 46304 88634 47784 87840 49318 86993 27 34 3255 90171 44802 89402 46855 88661 47793 87704 49348 86949 24 37 43255 90171 44802 89402 46835 88602 47869 87798 49384 86949 24 37 43255 90171 44802 89407 46330 88634 47946 87770 49454 86994 25 39 43261 90158 44878 89389 46381 88593 47920 87770 49456 86878 12 40 43313 90133 44880 89363 46630 88593 47920 87770 49456 86867 12 40 43313 90133 44880 89363 46630 88593 47920 87770 49456 86867 12 40 43313 90133 44880 89363 46637 88590 47946 87756 49470 86906 21 40 43313 90133 44880 89363 46631 88566 47971 87743 49495 86892 22 39 43267 90158 44958 89394 46510 88593 47920 87770 49454 86961 14 43340 90109 44950 89357 46661 88593 48022 87715 49546 86863 18 43 43967 90094 44956 89357 46664 88454 88593 47929 87715 49546 86865 18 43 43457 90070 45108 89298 46510 88526 48048 67701 49571 86849 17 44 43418 90082 44964 89311 46530 88526 48048 67701 49571 86849 17 43471 90057 45056 89285 46669 88451 48073 87687 49595 86873 19 43 43597 90146 44559 89964 46742 88404 48277 87555 49798 86719 13 50 43575 90007 45160 89929 46690 88431 48296 87603 49749 86762 11 50 43575 90007 45160 89929 46670 88431 48290 87603 49749 86661 4 50 43575 90009 45114 89929 46670 88391 48999 86661 4 50 43735 89918  |      |         |         |          |         |          |           |          |         |          |               |             |
| 23 42867 90346 44437 89584 45994 88795 47537 87979 49065 87136 37 24 42894 90334 44464 89571 46020 88782 47562 87865 49090 87121 36 25 42920 90321 44490 89558 46064 88768 47588 87951 49116 87107 35 26 42946 90309 44516 89545 46072 88755 47614 87937 49141 87093 34 27 42972 90296 44542 89532 46097 88755 47614 87937 49119 87079 33 28 42999 90284 44568 89519 46123 88728 47665 87909 49192 87064 32. 29 43025 90271 44594 89506 46149 88715 47690 87896 49217 87050 31 30 43037 90259 44620 89493 46175 88701 47716 87882 49242 87086 32. 23 43104 90233 44672 89467 46226 88674 47767 87854 49228 87007 28 23 43105 90291 44698 89454 46252 88661 47793 87840 49318 86993 27 34 43156 90208 44750 89425 46304 88634 74784 87866 49344 86998 26 35 43182 90196 44750 89425 46305 88630 47869 87798 49369 86964 25 36 43209 90183 44776 89415 46304 88634 47848 87812 49369 86964 25 37 43255 90171 44802 89402 46355 88607 47895 87798 49369 86964 25 38 43261 90158 44828 89389 46581 88593 47920 87770 49445 86921 22 39 43287 90146 44858 89389 46581 88593 47920 87770 49445 86921 22 43366 90198 44968 89350 46458 88580 47946 87756 49470 86986 21 40 43313 90133 44880 89363 46581 88593 47920 87770 49445 86921 22 43366 90198 44968 89350 46458 88580 47946 87756 49470 86986 21 40 43313 90133 44880 89363 46581 88593 47920 87770 49445 86921 22 43366 90198 44988 89354 46581 88593 47920 87770 49445 86921 22 43366 90198 44932 89337 46484 88539 48022 87715 49546 86863 18 43 43939 90095 44956 89285 46551 88499 48099 87673 49629 86890 15 46 43471 90057 45016 8928 46561 88499 48099 87673 49629 86890 15 48 43549 90019 45114 89245 46660 88431 48226 87683 49749 86677 12 48 43549 90019 45114 89232 46690 88431 88292 87664 99647 86680 14 43349 90095 44986 89286 46561 88499 48099 87673 49697 86677 12 43680 89984 45166 89219 46716 88417 88530 87684 49949 86690 66 43579 89918 45199 89906 46764 88434 88290 87603 49748 86762 11 50 43579 90032 45088 89259 46670 88436 48408 87701 49573 86679 13 50 43560 89949 45686 89285 46666 88445 88991 87664 98994 86690 66 50 43579 90032 45088 |      |         |         | 1        |         |          |           |          |         |          |               |             |
| 24         48894         90334         44464         89571         46020         88782         47562         87951         49090         87121         35           25         42940         90309         44516         89558         46046         88768         47588         87951         49116         87107         35           26         42940         90309         44518         89552         46097         88755         47614         87937         49141         87093         33           27         42979         90284         44568         89519         46123         88728         47665         87909         49192         87064         32           29         43025         90271         44558         89506         46149         88715         47690         87896         49217         87050         31           30         43051         90259         44620         89493         46175         88701         47716         87882         49242         87086         30           31         43077         90233         44672         89467         46252         88674         47761         87864         49298         87050         27  |      |         |         |          |         |          |           |          |         |          |               |             |
| 25   |      |         |         |          |         |          |           |          |         |          |               |             |
| 26         42946         90309         44516         89545         46072         88755         47614         87937         49141         87093         34           27         42972         90290         44542         89532         46097         88741         47659         87929         49166         87079         33           38         42999         90284         44568         89519         46123         88728         47660         87896         49217         87050         31           30         43051         90259         44620         89493         46175         88701         47716         87882         49242         87086         90           31         43077         90246         44666         89480         46201         88688         4774776         87854         49298         87021         29           32         43104         90233         44672         89467         46226         88661         47797         87840         49318         86993         27           34         43156         90208         44724         89441         46278         88671         47818         87836         49344         86978         25 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>  |      |         |         |          |         |          |           |          |         |          |               |             |
| 27         42972         90296         44542         89532         46097         88741         47639         87923         49166         87079         33           38         42999         90284         44568         89519         46123         88728         47665         87993         49192         87064         32           30         43051         90259         44620         89493         46175         88701         47716         87892         49242         87086         30           31         43077         90246         44646         89480         46201         88688         47741         87668         49288         87021         29           32         43104         90233         44672         89467         46226         88661         47787         87840         49318         86993         27           34         43156         90208         44750         89424         46278         88647         47818         87826         49344         86978         26           35         43182         90194         44750         89428         46304         88634         47844         87812         49369         86964         25  |      |         |         | - 1      |         |          |           |          |         |          |               |             |
| 38         42999         90284         44568         89519         46123         88728         47665         87909         49192         87064         32           29         43025         90271         44594         89506         46149         88715         47690         87896         49217         87050         31           30         43051         90259         44620         89493         46175         88701         47716         87882         49242         87086         39           31         43077         90246         44646         89480         46201         88688         47761         87854         49229         87007         28           33         43130         90221         44698         89454         46252         88661         47793         87840         49318         36992         26           34         43156         90208         447748         89441         46278         88647         47818         87896         49944         86978         26           35         43182         90196         44776         89415         46390         88690         47895         87794         49949         86969         21 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>33</td></td<>   |      |         |         |          |         |          |           |          |         |          |               | 33          |
| 29         43025         90271         44594         89506         46149         88715         47690         87896         49217         87050         31           30         43051         90259         44620         89493         46175         88701         47716         87882         49242         87086         30           31         43077         90246         44646         89480         46201         88688         47741         87868         49268         87021         29           32         43104         90233         44672         89467         46252         88661         47793         87840         49318         86993         27           34         43156         90208         44724         89441         46278         88647         47818         87826         49344         86978         26           35         43182         90196         44750         89415         46390         88694         47848         87812         49369         86949         24           37         43235         90171         44802         89402         46355         88607         47895         87784         49419         86945         22  |      |         |         |          |         |          |           |          |         |          |               |             |
| 30   | 1    |         |         |          |         |          |           |          |         |          |               |             |
| 31 43077 90246 44646 89480 46201 88688 47741 87668 49268 87021 29 32 43104 90293 44672 89467 46226 88674 47767 87854 49293 87007 28 33 43130 90221 44698 89454 46252 88661 47793 87840 49318 86993 27 34 43156 90208 44724 89441 46278 88647 47818 87826 49344 86978 26 35 43182 90196 44750 89428 46304 88634 47844 87812 49569 86964 25 36 43209 90183 44776 89415 46330 88620 47869 87798 49349 86949 24 37 4325 90171 44802 89402 46355 88607 47895 87798 49419 86935 23 38 43261 90158 44828 89389 46381 88593 47920 87770 49445 86921 22 39 43287 90146 44851 89376 46407 88580 47946 87756 49470 86906 21 40 43313 90133 44880 89363 46483 88566 47971 87743 49495 86892 20 41 43340 90120 44906 89350 46484 88539 48022 87715 49546 86663 18 43 43392 90095 44958 89324 46510 88526 48048 87701 49571 86869 17 44 43418 90082 44984 89311 46536 88512 48073 87687 49596 86834 16 43 43471 90057 45036 89285 465861 88499 48099 87673 49622 86820 15 46 43471 90057 45036 89285 465861 88499 48099 87673 49622 86820 15 46 43471 90057 45036 89285 465861 88499 48099 87673 49622 86820 15 47 43497 90045 45062 89272 46613 88472 48150 87645 49672 86791 13 48 43523 90032 45088 89259 46639 88485 48124 87635 49672 86791 13 48 43563 90009 45114 89245 46664 88445 48201 87617 49728 86770 12 49 43569 8994 45166 89219 46716 88417 48226 87603 49748 86748 10 50 43573 89904 45166 89219 46716 88417 48226 87603 49748 86748 10 50 43573 89904 45166 89219 46716 88417 48226 87603 49748 86748 10 50 43573 89904 45166 89219 46716 88417 48226 87503 49748 86749 11 50 43578 89968 45243 89180 46793 88377 48328 87561 49849 86690 6 55 43706 89943 45295 89167 46819 88363 48354 87552 49974 86675 5 56 43738 89900 45295 89167 46819 88363 48364 87504 49949 86690 6 55 43706 89943 45321 89140 46870 88336 48405 87504 49949 86690 6 55 43706 89943 45321 89140 46870 88336 48406 87504 49949 86690 6 56 43738 89900 45295 89153 46844 88349 48379 87518 49849 86690 6 57 43706 89943 45321 89140 46870 88336 48406 87500 49949 86661 4 57 43755 89918 45321 89140 468921 88308 48466 87466 49947 86662 2 59 48  |      | 10020   | 302/1   | 11331    | 03300   | 40149    | 00113     | 17030    | 01030   |          |               |             |
| 32         43104         90233         44672         89467         46226         88674         47767         87854         49293         87007         28           33         43130         90221         44698         89454         46282         88661         47793         87840         49318         86993         27           34         43156         90208         44724         89441         46278         88647         47818         87826         49344         86982         26           35         43182         90196         44750         89428         46304         88634         47844         87812         49369         86964         25           36         43209         90183         44776         89402         46355         88607         47895         87784         49419         86935         23           38         43261         90158         44828         89389         46381         88593         47920         87770         49445         86935         23           40         43313         90133         44880         89363         46433         88566         47971         87743         49495         86892         20  | 30   | 43051   | 90259   | 44620    | 89493   | 46175    | 88701     | 47716    | 87882   | 49242    | 87086         |             |
| 32 43104 90233 44672 89467 46226 88674 47767 87854 49295 87007 28 33 43130 90221 44698 89454 46252 88661 47793 87840 49318 86999 27 34 43156 90208 44724 89441 46278 88647 47818 87826 49344 86978 26 35 43182 90196 44750 89428 46304 88634 47844 87812 49369 86964 25 36 43209 90183 44776 89415 46330 88620 47869 87798 49394 86949 24 37 43235 90171 44802 89402 46355 88607 47895 87784 49419 86935 23 38 43261 90158 44828 89389 46381 88593 47920 87770 49445 86921 22 39 43287 90146 44851 89376 46407 88580 47946 87756 49470 86996 21 40 43313 90133 44880 89363 46433 88566 47971 87743 49495 86892 20 41 43340 90120 44906 89350 46484 88539 48022 87715 49546 86868 18 43 43992 90095 44958 89324 46510 88526 48048 87701 49571 86849 17 44 43418 90082 44984 89311 46536 88512 48073 87673 49526 86834 16 45 43445 90070 45010 89298 46561 88499 48099 87673 49622 86834 16 46 43471 90057 45036 89285 46561 88499 48099 87673 49622 86860 14 47 43497 90045 45062 89272 46613 88442 48150 87675 49672 86791 13 48 45523 90032 45088 89259 46669 88458 48175 87681 49697 86777 12 49 43549 90019 45114 89245 46661 88445 48201 87617 49723 86762 11 50 43575 90007 45140 89232 46669 88451 48252 87589 49748 86074 11 50 43575 90007 45140 89232 46669 88445 48201 87617 49723 86762 11 50 43575 90007 45140 89232 46669 88451 48252 87589 49748 86774 12 43680 89994 45166 89219 46716 88417 48252 87589 49748 86748 10 51 43602 89994 45166 89219 46716 88417 48252 87589 49748 86748 10 52 43628 89981 45192 80206 46742 88404 48277 87575 49798 86719 8 53 43688 89984 45269 89167 46819 88367 48358 87561 49824 86690 6 54 43706 89943 45269 89167 46819 88369 48354 87582 49874 86675 5 54 43706 89948 45269 89167 46819 88369 48354 87582 49874 86675 5 54 43706 89948 45298 89160 46640 88337 48399 87518 49899 86661 4 57 43759 89918 45521 89140 46670 88336 48406 87504 49924 86646 6 55 43706 89948 45398 89140 46670 88336 48405 87504 49924 86646 6 58 43733 89990 45295 89153 46844 88349 48399 87504 49924 86646 6 58 43738 89990 45399 89101 46947 88295 48481 87462 50000 86603 0  N.cos. N.si | 31   | 43077   | 90246   | 44646    | 89480   | 46201    |           | 47741    | 87868   | 49268    | 87021         | 29          |
| 33   | 32   | 43104   | 90233   | 44672    | 89467   | 46226    |           | 47767    | 87854   | 49293    | 87007         | 28          |
| 35         43182         90196         44750         89428         46304         88634         47844         87812         49369         86964         25           36         43209         90183         44776         89415         46330         88620         47869         87798         49849         86949         24           37         43235         90171         44802         89402         46355         88607         47895         87784         49419         86935         23           38         43261         90146         44854         89389         46381         88593         47946         87756         49470         86902         21           40         43313         90133         44880         89363         46433         88566         47971         87729         49521         86878         19           42         43966         90198         44906         89350         46458         88553         47997         87729         49521         86878         19           42         43966         90198         44932         89337         46484         88539         48022         87715         49521         86863         18  | 33   | 43130   | 90221   | 44698    | 89454   | 46252    |           | 47793    | 87840   | 49318    | <b>8699</b> 3 | 27          |
| 35         43209         90183         44776         89415         46330         88620         47869         87798         49894         86949         24           37         43235         90171         44802         89402         46355         88607         47895         87784         49419         86935         23           38         43261         90158         44828         89389         46381         88593         47920         87770         49445         86921         22           39         43287         90146         44851         89363         46433         88566         47946         87756         49470         86996         21           40         43313         90133         44880         89363         46433         88566         47971         87743         49495         86892         20           41         43340         90120         44906         89350         46484         88539         48022         87715         49546         86863         18           43         43362         90095         44958         89314         46510         88526         48048         87701         49546         86831         17  | 34   | 43156   | 90208   | 44724    | 89441   | 46278    | 88647     | 47818    | 87826   | 49344    | 86978         | 26          |
| 37         43235         90171         44802         89402         46355         88607         47895         87784         49419         86935         23           38         43261         90158         44828         89389         46381         88593         47920         87770         49445         86921         22           40         43313         90133         44880         89363         46433         88566         47971         87743         49495         86892         20           41         43340         90120         44906         89350         46484         88553         47997         87729         49521         86892         20           42         43366         90198         44938         89337         46484         88553         48022         87770         49521         86863         18           43         43392         90095         44958         89311         46536         88512         48073         87687         49596         86834         16           45         43418         90082         44944         89311         46536         88412         48073         49672         86820         15           45         434   | 35   | 43182   | 90196   | 44750    | 89428   | 46304    | 88634     | 47844    | 87812   | 49369    | 86964         |             |
| 38         43261         90158         4482k         89389         46381         88593         47920         87770         49445         86921         22           39         43287         90146         44854         89376         46407         88580         47946         87756         49470         86996         21           40         43313         90133         44880         89363         46483         88566         47971         87743         49495         86892         20           41         43340         90120         44906         89350         46484         88553         47997         87729         49521         86878         19           42         43366         90198         44958         89324         46510         88526         48048         87701         49571         86869         18           43         43918         90082         44964         89311         46536         88512         48078         87687         49576         86849         16           45         43441         90070         45010         89284         46561         88499         48099         87673         49622         86820         15  |      | 43209   | 90183   | 44776    | 89415   | 46330    | 88620     | 47869    | 87798   | 49894    | 86949         |             |
| 39         43287         90146         44854         89376         46407         88580         47946         87756         49470         86906         21           40         43313         90133         44880         89363         46433         88566         47971         87743         49495         86892         20           41         43340         90120         44906         89350         46484         88553         47997         87729         49521         86878         19           42         43966         90198         44932         89337         46484         88539         48022         87715         49546         86863         18           43         4392         90094         44964         89311         46510         88526         48048         87701         49576         86843         16           45         43445         90070         45010         89288         46561         88499         48099         87673         49526         86834         16           47         43497         90057         45068         89285         46613         88472         48150         87645         49672         86791         13           4   |      | 43235   | .90171  | 44802    | 89402   | 46355    | 88607     | 47895    | 87784   | 49419    | 86935         |             |
| 40 43313 90133 44880 89363 46433 88566 47971 87743 49495 86892 20 41 43340 90120 44906 89350 46458 88553 47997 87729 49521 86878 19 42 43966 90198 44932 89337 46484 88539 48022 87715 49546 86863 18 43 43392 90095 44958 89324 46510 88526 48048 87701 49571 86849 17 44 43418 90082 44984 89311 46536 88512 48073 87687 49596 86834 16 45 43447 90070 45010 89298 46561 88499 48099 87673 49622 86820 15 46 43471 90057 45036 89285 46587 88485 48124 87659 49647 86805 14 47 43497 90045 45062 89272 46613 88472 48150 87645 49672 86791 13 48 43523 90032 45088 89259 46639 88458 48175 87631 49697 86777 12 49 43549 90019 45114 89245 46664 88445 48201 87617 49723 86762 11 50 43575 90007 45140 89232 46690 88431 48226 87603 49748 86748 10 51 43602 89994 45166 89219 46716 88417 48252 87589 49738 86733 9 52 43628 89981 45192 89206 46742 88404 48277 87575 49798 86719 8 53 43654 89968 45218 89193 46767 88390 48303 87561 49849 86690 6 54 43680 89956 45243 89180 46793 88377 48328 87546 49849 86690 6 55 43706 89943 45269 89167 46819 88363 48354 87546 49849 86690 6 55 43706 89943 45269 89167 46819 88363 48354 87546 49849 86690 6 55 43706 89943 45269 89167 46819 88366 48405 87546 49849 86690 6 56 43733 89990 45295 89153 46844 88349 48379 87518 49899 86661 4 57 43759 89918 45321 89140 46670 88396 48546 87546 49849 86690 6 58 43785 89905 45243 89180 466793 88377 48328 87546 49849 86690 6 58 43785 89905 45243 89180 46670 88396 48505 87504 49924 86646 6 58 43785 89905 45243 89140 46670 88396 48405 87546 49849 86690 6 58 43785 89905 45347 89127 46896 88392 48490 87490 49950 86632 2 59 43811 89892 45373 89114 46921 88368 48456 87476 49975 86617 1 60 43831 89879 45399 89101 46947 88295 48481 87462 50000 86603 0  |      | 43261   | 90158   | 44828    | 89389   | 46381    | 88593     | 47920    | 87770   | 49445    | 86921         |             |
| 41 43340 90120 44906 89350 46458 88553 47997 87729 49521 86878 19 42 43966 90108 44992 89337 46484 88539 48022 87715 49546 86863 18 43 4392 90095 44958 89324 46510 88526 48048 87701 49571 86849 17 44 43418 90082 44984 89311 46536 88512 48073 87687 49596 86834 16 45 43445 90070 45010 89298 46561 88499 48099 87673 49622 86820 15 46 43471 90057 45066 89285 46587 88485 48124 87659 49647 86805 14 47 43497 90045 45062 89272 46613 88472 48150 87645 49672 86791 13 48 43523 90032 45088 89259 46639 88458 48175 87631 49697 86777 12 49 43549 90019 45114 89245 46664 88445 48201 87617 49723 86762 11 50 43575 90007 45140 89232 46690 88431 48226 87603 49748 86762 11 50 43575 90007 45140 89232 46690 88431 48226 87603 49748 86762 11 50 43568 89994 45166 89219 46716 88417 48252 87589 49773 86733 9 52 43628 89981 45192 89206 46742 88404 48277 87575 49798 86719 8 53 43654 89968 45218 89193 46767 88390 48303 87561 49824 86704 7 54 43680 89956 45243 89180 46793 88357 48328 87546 49824 86690 6 55 43706 89943 45269 89167 46819 88363 48354 87532 49874 86675 5 56 43733 89930 45295 89153 46844 88349 48379 87518 49899 86661 4 57 43759 89918 45321 89140 46870 88336 48456 87564 49824 86690 6 58 43785 89905 45243 89180 46793 88357 48358 87546 49849 86690 6 58 43785 89905 45243 89180 46793 88357 48358 87546 49849 86690 6 58 43785 89943 45269 89167 46819 88363 48354 87532 49874 86675 5 58 43785 89943 45269 89167 46819 88363 48354 87532 49874 86675 5 58 43785 89943 45269 89167 46819 88363 48354 87532 49874 86675 5 58 43785 89905 45347 89127 46896 88322 48490 87490 49940 86660 6 58 43785 89905 45347 89127 46896 88322 48490 87490 49950 86662 2 58 43811 89892 45373 89114 46921 88308 84846 87466 87466 49975 86617 1 60 43831 89879 45399 89101 46947 88295 48481 87462 50000 86603 0   | 39   | 43287   | 90146   | 44854    | 89376   | 46407    | 88580     | 47946    | 87756   | 49470    | 86906         | 21          |
| 41 43340 90120 44906 89350 46458 88553 47997 87729 49521 86878 19 42 43966 90108 44992 89337 46484 88539 48022 87715 49546 86863 18 43 4392 90095 44958 89324 46510 88526 48048 87701 49571 86849 17 44 43418 90082 44984 89311 46536 88512 48073 87687 49596 86834 16 45 43445 90070 45010 89298 46561 88499 48099 87673 49622 86820 15 46 43471 90057 45066 89285 46587 88485 48124 87659 49647 86805 14 47 43497 90045 45062 89272 46613 88472 48150 87645 49672 86791 13 48 43523 90032 45088 89259 46639 88458 48175 87631 49697 86777 12 49 43549 90019 45114 89245 46664 88445 48201 87617 49723 86762 11 50 43575 90007 45140 89232 46690 88431 48226 87603 49748 86762 11 50 43575 90007 45140 89232 46690 88431 48226 87603 49748 86762 11 50 43568 89994 45166 89219 46716 88417 48252 87589 49773 86733 9 52 43628 89981 45192 89206 46742 88404 48277 87575 49798 86719 8 53 43654 89968 45218 89193 46767 88390 48303 87561 49824 86704 7 54 43680 89956 45243 89180 46793 88357 48328 87546 49824 86690 6 55 43706 89943 45269 89167 46819 88363 48354 87532 49874 86675 5 56 43733 89930 45295 89153 46844 88349 48379 87518 49899 86661 4 57 43759 89918 45321 89140 46870 88336 48456 87564 49824 86690 6 58 43785 89905 45243 89180 46793 88357 48358 87546 49849 86690 6 58 43785 89905 45243 89180 46793 88357 48358 87546 49849 86690 6 58 43785 89943 45269 89167 46819 88363 48354 87532 49874 86675 5 58 43785 89943 45269 89167 46819 88363 48354 87532 49874 86675 5 58 43785 89943 45269 89167 46819 88363 48354 87532 49874 86675 5 58 43785 89905 45347 89127 46896 88322 48490 87490 49940 86660 6 58 43785 89905 45347 89127 46896 88322 48490 87490 49950 86662 2 58 43811 89892 45373 89114 46921 88308 84846 87466 87466 49975 86617 1 60 43831 89879 45399 89101 46947 88295 48481 87462 50000 86603 0   | 40   | 40010   | 00100   | 44000    | 20000   |          |           | 48051    |         | 40405    | eceno:        |             |
| 42         43966         90198         44932         8937         46484         88539         48022         87715         49546         86863         18           43         43592         90095         44958         89324         46510         88526         48048         67701         49571         86849         17           44         43418         90082         44964         89311         46536         88512         48073         4767         49596         86834         16           45         43447         90057         45036         89285         46587         88485         48124         87659         49647         86820         15           46         43471         90057         45036         89285         466587         88485         48124         87659         49647         86805         14           47         43497         90045         45062         89272         46613         88472         48150         87645         49672         86791         13           48         43523         90019         45114         89245         46664         88445         48175         87631         49697 <t td="">         86771         12      <tr< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr<></t>  |      |         |         |          |         |          |           |          |         |          |               |             |
| 43         43392         90095         44958         89324         46510         88526         48048         87701         49571         86849         17           44         43418         90082         44984         89311         46536         88512         48073         87687         49596         86834         16           45         43445         90070         45010         89285         46561         88499         48099         87673         49622         86820         15           46         43471         90057         45062         89285         46587         88485         48124         87659         49647         86805         14           47         43497         90045         45062         89272         46613         88472         48150         87631         49672         86791         13           48         43523         90029         45088         89259         46639         88458         48175         87631         49697         86777         12           49         43579         90019         45114         89232         46664         88445         48201         87617         49723         86762         11  |      |         |         |          |         |          |           |          |         |          |               |             |
| 44 43418 90082 44984 89311 46536 88512 48073 87687 49596 86834 16 45 43445 90070 45010 89298 46561 88499 48099 87673 49622 86820 15 46 43471 90057 45036 89285 46587 88485 48124 87653 49647 86805 14 47 43497 90045 45062 89272 46613 88472 48150 87645 49672 86791 13 48 43523 90032 45088 89259 46639 88458 48175 87631 49697 86777 12 49 43549 90019 45114 89245 46664 88445 48201 87617 49723 86762 11  50 43575 90007 45140 89232 46690 88431 48226 87603 49748 86748 10 51 43602 89994 45166 89219 46716 88417 48252 87589 49773 86733 9 52 43628 89981 45192 89206 46742 88404 48277 87575 49798 86719 8 53 43654 89968 45218 89193 46767 88390 48303 87561 49824 86704 7 54 43680 89956 45243 89180 46793 88377 48328 87546 49824 8670 4 7 54 43680 89956 45243 89180 46793 88377 48528 87546 49824 86690 6 55 43706 89943 45269 89167 46819 88363 48354 87532 49874 86675 5 56 43733 89950 45243 89180 46793 88377 48528 87546 49824 86690 6 57 43759 89918 45321 89140 46870 88396 48405 87504 49924 86646 8 58 43785 89905 45347 89127 46896 88392 48490 87490 49924 86646 6 58 43785 89905 45347 89127 46896 88392 48490 87490 49924 86661 4 58 43785 89905 45347 89127 46896 88392 48490 87490 49924 86661 1 60 43831 89879 45399 89101 46947 88295 48481 87462 50000 86603 0  N.cos. N.sine N.cos. N.sine N.cos. N.sine N.cos. N.sine N.cos. N.sine Min.  |      |         |         |          | •       |          |           |          |         |          |               |             |
| 45 43445 90070 45010 89298 46561 88499 48099 87673 49622 86820 15 46 43471 90057 45036 89285 46587 88485 48124 87659 49647 86805 14 47 43497 90045 45062 89272 46613 88472 48150 87645 49672 86791 13 48 43523 90032 45088 89259 46639 88458 48175 87631 49697 86777 12 49 43549 90019 45114 89245 46666 88445 48201 87617 49723 86762 11 50 43575 90007 45140 89232 46690 88431 48226 87603 49748 86748 10 51 43602 89994 45166 89219 46716 88417 48252 87589 49773 86733 9 52 43628 89981 45192 89206 46742 88404 48277 87555 49798 86719 8 53 43654 89968 45218 89193 46767 88390 48303 87561 49824 86704 7 54 43680 89956 45243 89180 46793 88357 48328 87546 49824 86704 7 54 43680 89956 45243 89180 46793 88357 48328 87546 49849 86690 6 55 43706 89943 45269 89167 46819 88363 48354 87532 49874 86675 5 56 43733 89930 45295 89153 46844 88349 48379 87518 49899 86661 4 57 43759 89918 45321 89140 46870 88336 48405 87504 49924 86646 3 58 43785 89905 45347 89127 46896 88392 48405 87466 49924 86646 3 58 43785 89905 45347 89127 46896 88322 48490 87490 49950 86632 2 59 43811 89892 45373 89114 46921 88368 48456 87476 49975 86617 1 60 43831 89879 45399 89101 46947 88295 48481 87462 50000 86603 0  |      |         |         |          |         |          |           |          |         |          |               |             |
| 46   |      |         |         |          |         |          |           |          |         |          |               |             |
| 47   |      |         |         | ,        |         |          |           |          |         |          |               |             |
| 48   |      |         |         | ,        |         |          |           |          |         |          |               |             |
| 49 43549 90019 45114 89245 46664 88445 48201 87617 49723 86762 11  50 43575 90007 45140 89232 46690 88431 48226 87603 49748 86748 10  51 43602 89994 45166 89219 46716 88417 48252 87589 4973 86733 9  52 43628 89981 45192 86206 46742 88404 48277 87575 49798 86719 8  53 43654 89968 45218 89193 46767 88390 48303 87561 49824 86704 7  54 43680 89956 45243 89180 46793 88397 48328 87546 49824 86704 7  55 43706 89943 45269 89167 46819 88363 48354 87532 49874 86675 5  56 43733 89930 45295 89153 46844 88349 48379 87518 49899 86661 4  57 43759 89918 45321 89140 46870 89336 48405 87504 49924 86646 8  58 43785 89905 45347 89127 46896 88322 48490 49925 86662 2  59 43811 89892 45373 89114 46921 88368 48456 87476 49975 86617 1  60 43831 89879 45399 89101 46947 88295 48481 87462 50000 86603 0  |      |         |         |          |         |          |           |          | T.      |          |               |             |
| 50         43575         90007         45140         89232         46690         88431         48226         87603         49748         86748         10           51         43602         89994         45166         89219         46716         88417         48252         87589         49773         86733         9           52         43628         89981         45192         89206         46742         88404         48277         87575         49798         86719         8           53         43654         89968         45218         89193         46767         88390         48303         87561         49824         86704         7           54         43680         89956         45243         89180         46793         88377         48328         87546         49849         86690         6           55         43706         89943         45295         89167         46819         88363         48354         87582         49874         86675         5           56         43733         89930         45295         89153         46844         88349         48379         87581         49994         86661         4           57 <td>. 1</td> <td></td> <td></td> <td>,</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>   | . 1  |         |         | ,        |         |          |           |          |         |          |               |             |
| 51   |      | 10013   | 30019   | 43114    | 09245   | 40004    | 00443     | 40201    | 01011   | 15120    | 00702         |             |
| 51 43602 89994 45166 89219 46716 88417 48252 87589 49773 86733 9 52 43628 89981 45192 89606 46742 88404 48277 87575 49798 86719 8 53 43654 89968 45218 89193 46767 88390 48303 87561 49824 86704 7 54 43680 89956 45243 89180 46793 88377 48328 87546 49824 86709 6 55 43706 89943 45269 89167 46819 88363 48354 87582 49874 86675 5 64 43733 89990 45295 89153 46844 88349 48379 87518 49899 86661 4 57 43759 89918 45921 89140 46870 89336 48405 87504 49924 86646 6 58 43785 89905 45347 89127 46896 88392 48490 49950 86632 2 59 43811 89892 45373 89114 46921 88308 48456 87466 49975 86617 1 60 43831 89879 45399 89101 46947 88295 48481 87462 50000 86603 0  |      | 43575   | 90007   | 45140    | 89232   | 46690    | 88431     | 48226    | 87603   | 49748    | 86748         | 10          |
| 52         43628         89981         45192         89206         46742         88404         48277         87575         49798         86719         8           53         43654         89968         45218         89193         46767         88390         48303         87561         49844         86704         7           54         43680         89956         45243         89180         46793         88377         48328         87561         49849         86690         6           55         43706         89943         45269         89167         46819         88363         48354         87532         49874         86675         5           56         43733         89930         45295         89153         46844         88349         48379         87518         49899         86661         4           57         43759         8918         45321         89140         46870         88396         48405         87504         49924         86646         6           58         43785         89005         45347         89127         46896         88322         48490         87490         49950         86632         2           59   |      | 43602   | 89994   | 45166    | 89219   |          |           |          |         | 49773    | 86733         | 9           |
| 53         43654         89968         45218         89193         46767         88390         48303         87561         49824         86704         7           54         43680         89956         45243         89180         46793         88377         48328         87546         49849         86690         6           55         43706         89943         45269         89167         46819         88363         48354         87532         49874         86675         5           56         43733         89990         45295         89153         46844         88349         48379         87518         49899         86661         4           57         43759         89918         45321         89140         46870         88392         48405         87504         49924         86646         6           58         43785         89905         45347         89127         46896         88322         48490         87490         49950         86632         2           59         43811         89892         45373         89114         46921         88368         48456         87476         49975         86617         1           60  |      |         |         |          |         |          |           |          |         |          |               | .8          |
| 54         43680         89956         45243         89180         46793         88377         48328         87546         49849         86690         6           55         43706         89943         45269         89167         46819         88363         48354         87592         49874         86675         5           56         43733         89930         45295         89153         46844         88349         48379         87518         49899         86661         4           57         43759         89918         45321         89140         46870         89364         48405         87504         49924         86646         6           58         43785         89905         45347         89127         46896         88322         48490         87490         49950         86632         2           59         43811         89892         45373         89114         46921         88368         48456         87476         49975         86617         1           60         43831         89879         45399         89101         46947         88295         48481         87462         50000         86603         0           N. cos.   |      |         | 89968   |          |         |          |           |          |         | 49824    | 86704         |             |
| 55         43706         89948         45269         89167         46819         88363         48354         87532         49874         86675         5           56         43733         89950         45295         89153         46844         88349         48379         87518         49899         86661         4           57         43759         89918         45321         89140         46870         89336         48405         87504         49924         86646         6           58         43785         89905         45347         89127         46896         88392         48490         87490         49950         86682         2           43811         89892         45373         89114         46921         88368         48456         87476         49975         86617         1           60         43831         89879         45399         89101         46947         88295         48481         87462         50000         86603         0           N. cos.         N. sine.         N. cos.         N. sine.         N. cos.         N. sine.         N. cos.         N. sine.   |      |         | 89956   | 45243    |         |          |           |          |         | 49849    | 86690         |             |
| 56     43733     89990     45295     89153     46844     88349     48379     87518     49899     86661     4       57     43759     89918     45321     89140     46670     88936     48405     87504     49924     86646     6       58     43785     89905     45347     89127     46896     88392     48490     87490     49950     86632     2       59     43811     89892     45373     89114     46921     88368     48456     87476     49975     86617     1       60     43831     89879     45399     89101     46947     88295     48481     87462     50000     86603     0       N. cos.     N. sine.     N. cos.     N. sine.     N. cos.     N. sine.     N. cos.     N. sine.     Min.  |      |         | 89943   | 45269    |         |          |           |          | 87532   | 49874    | 86675         | 5           |
| 57 437.59 89918 45321 89140 46870 89836 48405 87504 49924 86646 8 43785 89905 45347 89127 46896 88322 48430 87490 49950 86632 2 43831 89892 45373 89114 46921 88308 48456 87476 49975 86617 1 43831 89879 45399 89101 46947 88295 48481 87462 50000 86603 0 N. cos. N. sine, Min.  |      |         |         | 45295    | 89153   |          |           | 48379    | 87518   | 49899    | 86661         | 4           |
| 58     43785     89905     45347     89127     46896     88322     48490     87490     49950     86682     2       59     43811     88992     45373     89114     46921     88308     48456     87476     49975     86617     1       60     43831     89879     45399     89101     46947     88295     48481     87462     50000     86603     0       N. cos.     N. sine.     N. cos.     N. sine.     N. cos.     N. sine.     N. cos.     N. sine.     Min.  |      |         |         | 45321    | 89140   | . 46870  |           | 48405    | 87504   | 49924    | 86646.        |             |
| 59 43811 89892 45373 89114 46921 88308 48456 87476 49975 86617 1 43831 89879 45399 89101 46947 88295 48481 87462 50000 86603 0 N. cos. N. sine N. cos. N. sine N. cos. N. sine N. cos. N. sine Min.  |      |         | 89905   | 45347    | 89127   |          |           |          | 87490   | 49950    | 86632         |             |
| 60   43831   89879   45399   89101   46947   88295   48481   87462   50000   86603   0   N. cos.   N. sine.   Min.   |      |         |         |          |         |          |           |          |         |          | 86617         | 1           |
| N. cos. N. sine. N. cos. N. sine. N. cos. N. sine. N. cos. N. sine. Min.   | 60   | 43831   | 89879   | 45399    | 89101   |          | .88295    |          |         |          | 86603         | 0           |
|  |      | N coe   | N       | NI see   |         |          |           | <u> </u> | NT -    | NT and   | NI .          | NG          |
| 630 620 610 600  | 1    |         |         |          | ,       |          |           |          |         |          |               | win.        |
|  | 1    | 6       | 5°      | 68       | 30      | 6        | 20        | 6        | Io .    | 60       | ,             | L           |

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| ļ                                      | 0/             | <del>)° (</del> |                   |                |                 |          |                 | NES.    |                | 340            |      |
|--|----------------|-----------------|-------------------|----------------|-----------------|----------|-----------------|---------|----------------|----------------|------|
|  |                |                 | 310               |                | 320             |          | 33              |         |                |                |      |
| Min.                                   | N. sine.       | N. cos.         | N. sine.          | N. cos.        | N. sine.        | N. cos.  | N. sine.        | N. cos. | N. sine.       | N. cos.        | ll   |
| 0                                      | 50000          | 86603           | 51504             | 85717          | 52992           | 84805    | 54464           | 83867   | 55919          | 82904          | .60  |
| ĭ                                      | 50025          | 86588           | 51529             | 85702          | 53017           | 84789    | 54488           | 83851   | 55943          | 82887          | 59   |
| 2                                      | 50050          | 86573           | 51554             | 85687          | 53041           | 84774    | 54513           | 83835   | 55968          | 82871          | 58   |
| ŝ                                      | 50076          | 86559           | 51579             | 85672          | 53066           | 84759    | 54537           | 83819   | 55992          | 82855          | 57   |
| 4                                      | 50101          | 86544           | 51604             | 85657          | 5S091           | 84743    | 54561           | 83804   | 56016          | 82839          | 56   |
| 5                                      | 50186          | 86530           | 51628             | 85642          | 53115           | 84728    | 44586           | 83788   | 56040          | 82822          | 55   |
| 6                                      | 50151          | 86515           | 51653             | 85627          | 53110           | 84712    | 54610           | 83772   | 56064          | 82806          | 54   |
| 7                                      | 50176          | <b>8</b> 6501   |                   |                | 53164           | 84697    | 54635           | 83756   | 56088          | 82790          | 53   |
| В                                      | . 50201        | 86486           | 51678             | 85612          | 53189           | 84681    | 54659           |         | 56112          | 82773          | 52   |
| 9                                      | 50201          | <b>8647</b> 1   | 51703             | 85597          | 53214           |          |                 | 83740   | 56136          | 82757          | 51   |
|  | 30221          | 901/1           | 51728             | 85582          | 33214           | 84666    | 54683           | 83724   | 30130          | 02101          |      |
| 10                                     | 50252          | 86457           | 51753             | 85567          | 53238           | 84650    | 547Ó8           | 83708   | 56160          | 82741          | 50   |
| 11                                     | 50277          | 86442           | 51778             | 85551          | 53263           | 84635    | 54732           | 83692   | 56184          | 82724          | 49   |
| 12                                     | 50302          | 86427           | 51803             | 85536          | 53288           | 84619    | 54756           | 83676   | 56208          | 82708          | 48   |
| 18                                     | 50927          | 86413           | 51828             | 85521          | 53312           | 84604    | 54781           | 83660   | 56232          | 82692          | 47   |
| 14                                     | 50352          | 86398           | 51852             | <b>855</b> 06  | 53337           | 84588    | 54805           | 83645   | 56256          | 82675          | 46   |
| 15                                     | 50377          | 86384           | 51877             | 85491          | 53361           | 84573    | 54829           | 83629   | 56280          | 82659          | 45   |
| 16                                     | 50408          | <b>8636</b> 9   | 51902             | 85476          | <i>5</i> 3386   | 84557    | 54854           | 83613   | 563 <b>05</b>  | 82643          | 44   |
| 17                                     | 50428          | 86954           | 51927             | 85461          | 53411           | 84542    | 54878           | 83597   | 56329          | 82626          | 43   |
| 18                                     | 50453          | 86940           | 51952             | <b>8544</b> 6  | 53435           | 84526    | 54902           | 83581   | 56353          | 82610          | 42   |
| 19                                     | 50478          | 86325           | 51977             | 85431          | 53460           | 84511    | 54927           | 83565   | 56377          | 82593          | 41   |
| [                                      | 55110          |                 |                   | 00101          |                 |          |                 |         |                |                |      |
| 20                                     | 50503          | 86810           | 52002             | 85416          | 53484           | 84495    | 54951           | 83549   | 56 <b>40</b> 1 | 82577          | 40   |
| 81                                     | 50528          | 86295           | 52026             | 85401          | 53509           | 84480    | 54975           | 83533   | 56425          | 82561          | 39   |
| 22                                     | 50558          | 86281           | 52051             | 8 <b>5</b> 385 | 53534           | 84464    | 54999           | 83517   | 56449          | 825 <b>4</b> 4 | 38   |
| 28                                     | 50578          | 86266           | 52076             | 8 <b>53</b> 70 | 535 <b>5</b> 8  | 84448    | 55024           | 83501   | 56473          | 82528          | 37   |
| 92<br>93<br>94<br>95<br>96<br>97       | 50608          | 86251           | <b>5</b> 2101     | 85355          | 53583           | 84433    | <i>55</i> 048   | 83485   | <i>5</i> 6497  | 82511          | 36   |
| 25                                     | 50628          | 86237           | 52126             | 85340          | 53607           | 84417    | 55072           | 83469   | 56521          | 82495          | 35   |
| 26                                     | 50654          | 86222           | 52151             | 85325          | 53632           | 84402    | 55097           | 8345S   | 56545          | 82478          | 34   |
| 27                                     | 50679          | 86207           | 52175             | 85310          | 53656           | 84386    | 55121           | 83437   | 56569          | 82462          | 33   |
| 28                                     | 50704          | 86192           | 52200             | 85294          | 53681           | 84370    | 55145           | 83491   | 56593          | 82446          | 32   |
| 29                                     | 50729          | 86178           | 52225             | 85279          | <b>5</b> 3705   | 84355    | 55169           | 83405   | 56617          | 82429          | 31   |
| -:                                     |                |                 |                   |                |                 |          |                 |         | 7.500.11       | 00410          |      |
| 30                                     | 50754          | 86163           | 52250             | 85264          | 53730           | 84339    | 55194           | 83389   | 56641          | 82413          | 30   |
| 81                                     | 50779          | 86148           | 52275             | <b>8524</b> 9  | 53754           | 84324    | <i>55</i> 218 · | 83373   | 56665          | 82396          | 29   |
| 82                                     | 50804          | 86133           | 52299             | 85234          | 53779           | 84308    | 55242           | 83356   | 56689          | 82380          | 28   |
| 83                                     | 50829          | 86119           | 52324             | 85218          | <i>5</i> 3804 - | 84292    | <i>5</i> 5266   | 83340   | 56713          | 82363          | 27   |
| 84                                     | 50854          | 86104           | <i>5</i> 2349     | 85203          | 53828           | 84277    | 55291           | 85324   | 56736          | 82347          | 26   |
| 35                                     | 50879          | 86089           | 52374             | 85188          | 53853           | 84261    | 5531 <i>5</i>   | 83308   | 56760          | 82330          | 25   |
| 86                                     | 50904          | 86074           | 5239 <del>9</del> | 85173          | 53877           | 84245    | 55339           | 83292   | 56784          | 82314          | 24   |
| 87                                     | 50929          | 86059           | 52423             | 85157          | 53902           | 84230    | <i>5</i> 5363   | 83276   | 56808          | 82297          | 23   |
| 88                                     | 50954          | 86045           | 52448             | 85142          | 53926           | 84214    | 55388           | 83260   | 56832          | 82281          | 22   |
| 89                                     | 50979          | 86030           | <b>524</b> 73     | 85127          | 53951           | 84198    | 55412           | 83244   | 56856          | 82264          | 21   |
| 40                                     | E1001          | 86015           | 52498             | 95110          | 53975           | 84182    | 55436           | 83228   | 56880          | 82248          | 20   |
| 40<br>41                               | 51004<br>51029 | 86000           | 52496<br>52522    | 85112<br>85096 | 540 <b>0</b> 0  | 84167    | 55460           | 83212   | 56904          | 82231          | 19   |
| 42                                     |                | 85985           | 52522<br>52547    |                | 54024           | 84151    | 55484           | 83195   | 56928          | 82214          | 18   |
|  | 51054<br>51079 | 85970           | 52572             | 85081<br>85066 | 54049           | 84135    | 55509           | 83179   | 56952          | 82198          | 17   |
| 44                                     | 51104          | 85956           | 52597             | 85051          | 54073           | 84120    | <i>555</i> 33   | 83163   | 56976          | 82181          | 16   |
| 48<br>44<br>45                         |                | 85941           | 52621             | 850 <b>3</b> 5 | 54073<br>54097  | 84104    | 55557           | 83147   | 57000          | 82165          | 15   |
| 46                                     | 51129<br>51154 | 85926           | 52621<br>52646    | 85020          | 54122           | 84088    | 55581           | 83131   | 57024          | 82148          | 14   |
| 47                                     | 51179          | 85911           | 52671             | 85005          | 54146           | 84072    | <b>55605</b>    | 83115   | 57047          | 82132          | 13   |
| 48                                     | 51179<br>51204 | 8589G           | 52696             | 84989          | 54171           | 84057    | 55630           | 83098   | 57071          | 82115          | 12   |
| 49                                     |                | 85881           | 52720             | 84974          | 54195           | 84041    | 55654           | 83082   | 57095          | 82098          | ii   |
| 49<br>50                               | 51229          | 00001           |                   | 01317          | 0.133           | 07071    |                 | 00002   |                |                | LI   |
| 50                                     | 51254          | 85866           | 527.45            | 84959          | 54220           | 84025    | 55678           | 83066   | 57119          |                | 10   |
|  | 51279          | 85851           | 52770             | 84948          | 54244           | 84009    | 55702           | 83050   | 57143          | 82065          | 9    |
| 52                                     | 51904          | 85836           | 52794             | 84928          | 54269           | 83994    | 55726           | 83034   | 57167          | 82048          | 8    |
| 53                                     | 51329          | 85821           | 52819             | 84913          | 54293           | 83978    | <b>5575</b> 0   | 83017   | 57191          | 82032          | 7    |
| 51<br>52<br>53<br>54<br>55<br>56<br>57 | 51354          | 85806           | 52844             | 84897          | 54917           | 83962    | 55775           | 83001   | 57215          | 82015          | 6    |
| 55                                     | 51379          | 85792           | 52869             | 84882          | 54342           | 83946    | 55799           | 82985   | 57238          | 81999          | 5    |
| <b>5</b> 6                             | 51404          | 85777           | 52893             | 84966          | 54366           | 83930    | <i>55</i> 823   | 82969   | 57262          | 81982          | 4    |
| 57                                     | 51429          | 85762           | 52918             | 84851          | 54391           | 83915    | 55847           | 82953   | 57286          | 81965          | 3    |
| 58                                     | 51454          | 85747           | 52948             | 84886          | 54415           | 83899    | 55871           | 82936   | <i>5</i> 7310  | 81949          | 2    |
| <b>5</b> 9                             | 51479          | 85732           | 52967             | 84820          | 54440           | 88883    | <i>55</i> 895   | 82920   | 57934          | 81932          | 1    |
| 60                                     | 51504          | 857174          | 52992             | 84805          | 54464           | 83867    | <i>55</i> 919   | 82904   | 57858          | 81915          | ō    |
|  |                |                 | <del></del>       |                |                 |          |                 |         |                |                |      |
|  | N. cos.        |                 | N. cos.           | N. sine.       |                 | N. sine. |                 |         |                | N. sine.       | Min. |
| 1                                      | 59             | 0               | 50                | 30             | 5'              | 70       | 50              | 60      | 55             | 50             |      |
| -                                      |                |                 |                   |                |                 |          |                 |         | -              |                |      |

|          | 1 3.           | 5°              | 3                      | 60                      | 3                  | 70                               | 3                       | 80             | 3              | 90 1                   |          |
|----------|----------------|-----------------|------------------------|-------------------------|--------------------|----------------------------------|-------------------------|----------------|----------------|------------------------|----------|
| Min.     | N. sine.       |                 |                        | N. cos.                 |                    | N. cos.                          | N. sine.                | N. cos.        | N. sine.       |                        |          |
| 0        | 57358          | 81915           | 58779                  | 80902                   | 60182              | 79864                            | 61566                   | 78801          | 62932          | 77715                  | `60      |
| i        | 57381          | 81899           | 58802                  | 80885                   | 60205              | 79846                            | 61589                   | 78783          | 62955          | 77696                  | 59       |
| 2        | 57405          | 81882           | 58826                  | 80867                   | 60228              | 79829                            | 61612                   | 78765          | 62977          | 77678                  | ,58      |
| 3        | 57429          | 81865           | 58849                  | 80850                   | 60251              | 79811                            | 61635                   | 78747          | 63000          | 77660                  | 57       |
| 4        | 57453          | 81848           | 58873                  | 80833                   | 60274              | 79793                            | 61658                   | 78729          | 68022<br>68045 | 77641                  | 56<br>55 |
| 5        | 57477          | 81832           | 58896                  | 80816                   | 60298              | 79776                            | 61681<br>61704          | 78711<br>78694 | 63068          | 77623<br>7760 <b>5</b> | 54<br>54 |
| 6 7      | 57501<br>57524 | 81815<br>81798  | 58920<br>58943         | 80799<br>80782          | 60321<br>60344     | 79758<br>79741                   | 61704                   | 78676          | 68090          | 77586                  | . 53     |
| 8        | 57548          | 81782           | 58967                  | 80765                   | 60367              | 79723                            | 61749                   | 78658          | 68113          | 77568                  | 52       |
| 9        | 57572          | 81765           | 58990                  | 80748                   | 60390              | 79706                            | 61772                   | 78640          | 63135          | 77550                  | 51       |
| I        |                |                 |                        | 80730                   | 60414              | 79688                            | 61795                   | 78622          | 63158          | 77531                  | 50       |
| 10<br>11 | 57596<br>57619 | 81748<br>81731  | 59014<br>59037         | 80713                   | 60437              | 79671                            | 61818                   | 78604          | 63180          | 77513                  | 49       |
| 12       | 57643          | 81714           | 59061                  | 80696                   | 60460              | 79653                            | 61841                   | 78586          | 63203          | 77494                  | 48       |
| 18       | 57667          | 81698           | 59084                  | 80679                   | 60483              | 79635                            | 61864                   | 78568          | 63225          | 77476                  | 47       |
| 14       | 57691          | 81681           | <i>5</i> 9108.         | 80662                   | 60506              | 79618                            | 61887                   | 78550          | 63248          | 77458                  | 46       |
| 15       | 57715          | 81664           | 59131                  | 80644                   | 60529              | 79600                            | 61909                   | 78532          | 63271          | 77439                  | 45<br>44 |
| 16       | 57738          | 81647           | 59154                  | 80627                   | 60553              | <b>7958</b> 3                    | 61992                   | 78514          | 63293<br>63316 | 77421<br>77402         | 43       |
| 17       | 57762          | 81631           | 59178                  | 80610                   | 60576              | 79565                            | 61955                   | 78496<br>78478 | 63338          | 77384                  | 42       |
| 18<br>19 | 57786<br>57810 | 81614<br>81597  | 59201<br>5922 <b>5</b> | 80593<br>80576          | 60599<br>60622     | 79 <b>54</b> 7<br>79 <b>5</b> 30 | 61978<br>62001          | 78460          | 63361          | 77366                  | 41       |
|          |                |                 |                        | <del></del>             |                    |                                  | <u> </u>                |                |                |                        | 40       |
| 20       | 57833          | 81580           | 59248                  | 80558                   | 60645              | 79512                            | 62024                   | 78412<br>78424 | 63383<br>63406 | 77347<br>77329         | 39       |
| 21<br>22 | 57857          | 81563           | 59272<br>59295         | 80541<br>80524          | 60668<br>60691     | 76494<br>79477                   | 62046<br>62069          | 78405          | 63428          | 77310                  | 38       |
| 23       | 57881<br>57904 | 81546<br>81530  | 59318                  | 80507                   | 60714              | 79459                            | 62092                   | 78387          | 63451          | .77292                 | 37       |
| 24       | 57928          | 81513           | 59342                  | 80489                   | 60738              | 79441                            | 62115                   | 78369          | 63473          | 77273                  | 36       |
| 25       | 57952          | 81496           | 59365                  | 80472                   | 60761              | 79424                            | 62138                   | 78351          | 63496          | 77255                  | 35       |
| 26       | 57976          | 81479           | 59389                  | 80455                   | 60784              | 79406                            | 62160                   | 78333          | 63518          | 77236                  | 34       |
| 27       | 57999          | 81462           | 59412                  | 80438                   | 60807              | 79388                            | 62183                   | 78815          | 63540          | 77218                  | 33       |
| 28       | 58023          | 81445           | 59436                  | 80420                   | 60830              | 79371                            | 62206                   | 78297          | 68568          | 77199                  | 32<br>31 |
| 29       | 58047          | 81428           | 59459                  | 80403                   | 60853              | 79353                            | 62229                   | 78279          | 63585          | 77181                  |          |
| 30       | 58070          | 81412           | 59482                  | 80386                   | 60876              | 79335                            | 62251                   | 78261          | 63608          | 77162                  | '30      |
| 31       | 58094          | 81395           | 59506                  | 803 <b>6</b> 8          | 60899              | 79318                            | 62274                   | 78243          | 63630          | 77144                  | 29       |
| 32       | 58118          | 81378           | 59529                  | 80351                   | 60922              | 79300                            | 62297                   | 78225          | 63653          | 77125<br>77107         | 28<br>27 |
| 33       | 58141          | 81361           | 59552                  | 80334                   | 60945              | 79282                            | 62320<br>62342          | 78206<br>78188 | 63675<br>63698 | 77088                  | 26       |
| 34<br>35 | 58165<br>58189 | 81344<br>81327  | `59576<br>59599        | 80316<br>8 <b>029</b> 9 | 60968 <sub>.</sub> | 79264<br>79247                   | 62865                   | 78170          | 63720          | 77070                  | 25       |
| 36       | 58212          | 81310           | 59622                  | 80282                   | 61015              | 79229                            | 62388                   | 78152          | 63742          | 77051                  | 24       |
| 37       | 58236          | .81293          | 59646                  | 80264                   | 61038              | 79211                            | 62411                   | 78134          | 63765          | 77033                  | 23       |
| 38       | <i>5</i> 8260  | 81276           | 59669                  | 80247                   | 61061              | 79193                            | 62483                   | 78116          | 63787          | 77014                  | 22       |
| 39       | 58283          | 81259           | 59693                  | 80230                   | 61084              | 79176                            | 62456                   | 78098          | 63810          | 76996                  | 21       |
| 40       | 58307          | 81242           | 59716                  | 80212                   | 61107              | 79158                            | 62479                   | 78079          | 63832          | 76977                  | 20       |
| 41       | 58330          | 81225           | 59739                  | 80195                   | 61130              | 79140                            | 62502                   | 78061          | 63854          | 76959                  | 19       |
| 42       | 58354          | 81208           | <i>5</i> 9763          | 80178                   | 61153              | 79122                            | 62 <b>5</b> 24          | 78043          | 63877          | 76940                  | 18       |
| 43       | 58378          | 81191           | 59786                  | 80160                   | 61176              | 79105                            | 62547                   | 78025          | 63899          | 76921                  | 17       |
| 44       | 58401          | 81174           | 59809                  | 80143                   | 61199              | 79087                            | 62570                   | 78007<br>77988 | 63922<br>63944 | 76903<br>76884         | 16<br>15 |
| 45<br>46 | 58425<br>58449 | 81157<br>81140  | 59832<br>59856         | 80125<br>80108          | 61222<br>61245     | 79069<br>79051                   | 62592<br><b>6261</b> 5  | 77970          | 68966          | 76866                  | 14       |
| 47       | 58472          | 81123           | 59879                  | 80091                   | 61268              | 79033                            | 62638                   | 77952          | 68989          | 76847                  | 13       |
| 48       | 58496          | 81106           | 59902                  | 80073                   | 61291              | 79016                            | 62660                   | 77984          | 64011          | 76828                  | 12       |
| 49       | 58519          | 81089           | 59926                  | 80056                   | 61314              | 78998                            | 62683                   | 77916          | <b>64</b> 083  | 76810                  | 11       |
| 50       | 58543          | 81072           | 59949                  | 80038                   | 61337              | 78980                            | 62706                   | 77897          | G4056          | 76791                  | 10       |
| 51       | 58567          | 81055           | 59972.                 |                         | 61360              | 78962                            | 62728                   | 77879          | 64078          | 76772                  | 9        |
| 52       | 58590          | 81038           | <b>599</b> 95          | 80003                   | 61383              | 78944                            | 62751                   | 77861          | 64100          | 76754                  | 8        |
| 53       | 58614          | 81021           | 60019                  | 79986                   | 61406              | 78926                            | 62774                   | 77843          | 64123          | 76735                  | 7        |
| 54       | 58637          | 81004           | 60042                  | 79968                   | 61429              | 78908                            | 62796                   | 77824          | 64145          | 76717                  | 6        |
| 55<br>56 | 58661          | 80987           | 60065                  | 79951                   | 61451              | 78891                            | 62819                   | 77806          | 64167<br>64190 | 76698<br>76679         | 5<br>4   |
| 56<br>57 | 58684<br>58708 | 80970°<br>80953 | 60089<br>60112         | 79934<br>79916          | 61474<br>61497     | 78873<br>78855                   | 628 <b>4</b> 2<br>62864 | 77788          | 64212          | 76661                  | 3        |
| 58       | 58731          | 80936           | 60112                  | 79899                   | 61520              | 78837                            | 62887                   | 77751          | 64294          | 76642                  | 2        |
| 59       | 58755          | 80919           | 60158                  | 79881                   | 61543              | 78819                            | 62909                   | 77788          | 64256          | 76623                  | ĩ        |
| 60       | 58779          | 80902           | 60182                  | 79864                   | 61566              | 78801                            | 62932                   | 77715          | 64279          | 76604                  | 0        |
|          | N. cos.        | N. sine.        | N. cos.                | N. sine.                | N. cos.            | Ñ. sine.                         | N. cos.                 | N. sine.       | N. cos.        | N. sine.               | Min      |
|          |                | 40              |                        | 30                      |                    | 20                               | <u> </u>                | 10             |                | 00                     |          |
| -        |                | Contract of     |                        |                         |                    |                                  |                         |                |                |                        |          |
|          |                |                 |                        |                         |                    |                                  |                         |                |                |                        |          |

#### TO FIND THE LATITUDE BY DOUBLE ALTITUDES, AND THE ELAPSED TIME.

| M.   O'   10'   20'   30'   40'   50'   M.   12'   20'   30'   40'   50'   M.   O'   10'   20'   30'   40'   50'   40'   50'   M.   12'   20'   30'   40'   50'   40'   50'   40'   40'   40'   40'   40'   40'   41'    |     | Argument. HALF ELAPSED TIME. |          |       |         |        |                |           |          |         |        |        |       |          |
|--|-----|------------------------------|----------|-------|---------|--------|----------------|-----------|----------|---------|--------|--------|-------|----------|
| M.   Off   107   207   307   407   505   M.   Off   107   207   307   407   307   307   407   307   307   407   307   307   407   307   307   407   307      | -   | ī                            |          | '2 Ho |         |        |                | 1         | 111 02.2 | 141412  |        | urs.   |       |          |
| 7  | M.  | 0//                          | 10"      |       |         | 40"    | 50"            | M.        | 0"       | 10″     | 20"    | 30"    | 40"   | 50"      |
| 1  | 0   | 0.30103                      | 30048    | 29994 | 29939   | 29885  | 29831          | 0         | 0.15051  | 15020   | 14988  | 14957  | 14926 | 14894    |
| 2 29453 29399 29346 29293 29319 2936 2 144676 14640 14426 14226 14236 14426 14236 13426 13326 13 |     |                              | 29722    | 29668 | 29614   | 29560  | 29507          | 1         | 14863    | 14832   | 14800  | 14769  | 14738 | 14707    |
| \$\frac{9}{2} \frac{9}{2} \fr  | 2   | 29453                        | 29399    | 29346 | 29293   |        | .29186         |           | 14676    | 14645   | 14614  | 14583  | 14552 | 14521    |
| 5 28502 28450 28988 28546 38295 28245 5 14124 14094 14064 14034 14004 14034 14004 177 177 27127  | 3   | 29153                        | 29080    |       |         |        |                |           |          |         |        |        |       |          |
| 6 28191 28140 28089 28087 27986 27985 6 13944 13914 13884 13854 13854 13854 13854 13854 13854 13854 13854 13854 13854 13854 13854 13854 13854 13854 13854 13854 13855 13907 1397 13970 139 |     |                              |          |       |         |        |                |           |          |         |        |        |       | 14155    |
| 7 27884 27883 27789 27781 27600 27800 7 13765 13795 13705 13676 1846 188 27779 27579 27589 27787 27782 2778 27379 27780 7 27028 9 13411 13382 13353 13394 13395 135 110 0.28978 26693 26693 26693 26595 26648 26635 26468 26438 11 1 26682 26633 26584 26595 26448 26195 26147 12 12893 12664 13835 13907 12978 13950 1312 131 132 26099 26051 26003 25955 25907 25859 13 12723 12666 12635 12601 12778 1276 1276 1276 1276 1276 1276 1276 1276  |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 9 27277 27297 27177 2712 |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 19   |     |                              |          | -,    |         |        |                |           |          |         |        |        |       |          |
| 10   0.26978   26929   26879   26880   26781   26731   10   0.19287   13208   13179   13150   13121   132   26882   26333   26384   26535   26486   26438   11   13064   13035   13007   13978   13950   13121   1313   26999   26331   26903   25955   25907   25859   13   12725   12695   12666   12638   12610   122   13150   13121   13150   1   |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 11 2 6688 2 26631 26584 26535 26486 26438 11 13064 13035 13007 12978 12950 132 26688 26349 265479 25452 25507 25859 13 12723 12665 12666 12638 12610 132 14 25811 25761 25766 25678 25716 25668 25621 25678 25716 25668 25621 25678 25716 25668 25621 25678 25716 25668 25621 25678 25716 25668 25621 25678 25716 25668 25621 25678 12578 12575 12586 12699 12471 12448 136 15 2554 2578 25479 25473 25482 25885 2538 25921 15 15387 12360 12392 12305 12377 12471 12448 1362 1578 24687 24641 24595 24550 24504 24458 18 11895 11868 11842 11815 1189 118 24687 24681 24595 24550 24504 24458 18 11895 11868 11842 11815 1189 1189 1189 1189 1189 1189 118  | 9   | 27277                        | 2/22/    | 27177 | 2/12/   | 27077  | 27028          |           | 13411    | 13382   | 13353  | 13324  | 13295 | 13200    |
| 12   28399   28440   28299   28244   26197   25850   13   12772   12651   12656   12638   12610   12773   13   12723   12652   12656   12638   12610   12511   125521   125526   12637   12656   12638   12610   12511   125521   125526   12637   12656   12638   12610   12511   125524   12526   12636   12638   12610   12511   125524   12526   12636   12638   12610   12511   125524   12526   12636   12638   12610   12511   12552   12636   12638   12600   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632   12636   12632    | 10  | 0.26978                      | 26929    | 26879 | 26830   | 26781  | 26731          | 10        | 0.13237  | 13208   | 13179  | 13150  | 13121 | 13093    |
| 19   25909   25051   25003   259.55   25907   258.59   13   12728   12505   12605      | 11  | 26682                        | 26633    | 26584 | 26535   | -26486 | 26438          | 11        | 13064    | 13035   | 13007  | 12978  | 12950 | 12921    |
| 14   | 12  | <b>2</b> 6389                | 26340    | 26292 | 26244   | 26195  | 26147          |           | 12893    | 12864   | 12835  | 12807  | 12779 | 12751    |
| 15   25526   25479   25492   25985   25988   25991   16   12887   12960   19392   12905   19277   12161   17   24964   24918   24872   24827   24753   24753   17   12058   12031   12004   11977   11949   118   118   24687   24641   24595   24550   24504   24458   18   11895   11868   11842   11815   11768   119   24413   24967   24931   24186   18   11895   11868   11842   11815   11768   119   24413   24967   24931   24186   18   11895   11868   11842   11815   11768   119   11941   12068   12041   12046   24051   24931   24186   18   11895   11868   11842   11815   11768   119   11945   11868   11842   11815   11768   119   11945   11868   11842   11815   11768   119   11945   11869   11848   11845   11868   11842   11815   11768   119   11945   11868   11842   11815   11768   119   11945   11868   11842   11815   11768   119   11945   11868   11842   11815   11768   119   11945   11868   11842   11815   11768   119      | 13  | 26099                        |          |       |         |        |                |           |          | 12695   | 12666  | 12638  | 12610 |          |
| 16   | 14  |                              | 25763    |       |         |        |                |           |          |         |        |        |       |          |
| 17   24964   24918   24872   24825   24779   24733   17   12068   12004   11977   11949   118   118   24687   24641   24995   24550   24504   24458   18   11895   11868   11842   11815   11788   117   11843   11842   11815   11788   117   11843   11843   11842   11815   11788   117   11843     | 15  |                              |          |       |         |        |                |           |          |         |        |        |       | 12249    |
| 18   |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 19   |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 20 0. 24141 24096 24051 24006 23961 23916 20 0. 11575 11548 11522 11495 11469 114 21 23871 23827 23782 23738 23693 23649 21 11416 11390 11364 11338 11312 115 22 23605 23560 23516 23472 23428 23384 22 11259 11233 11207 11181 1155 111 23 237340 23936 23925 232592 232592 23165 231120 111078 11052 11027 11001 10 24 23078 23035 22991 22948 22905 22862 24 10950 10924 10899 10873 10848 106 25 22819 22775 22732 22669 23647 22604 25 10797 10772 10746 10721 10660 100 26 22951 22519 22476 22433 22391 22949 2349 2060 27 22306 22264 22222 22180 22138 22096 27 10495 10471 10446 10421 10396 105 28 23054 22012 21970 21967 21638 21596 29 10199 10175 10151 10126 10102 102 29 21803 21762 21750 21679 21638 21596 29 10199 10175 10151 10126 10102 102 30 0. 21555 21514 21473 21492 21391 21350 30 0. 10053 10029 10005 09981 09957 095 31 21309 21269 21228 21187 21147 21106 31 09909 09885 09861 09837 09813 09953 20662 2074 20764 20764 20655 20625 30 09623 09859 09576 09552 09529 0953 20640 20744 20704 20655 20625 30 09623 09599 09576 09552 09529 0953 20260 2026 |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 21 23675 23560 23576 23472 23428 23584 22 11259 11233 11207 11181 11155 1123 235940 232592 23252 232592 23163 231840 232592 23252 232909 23163 23192 211104 11078 110252 11027 11001 1054 1023 23252 232592 232592 23269 23647 23269 2353 11104 11078 110252 11027 11001 1054 1023 23252 232592 23269 23647 23269 24 10950 10924 10899 10873 10848 106 22 232561 232519 232476 23433 23291 23249 26 10646 10620 10595 10570 10545 103 22 23056 232564 23292 23180 23138 22096 27 10495 10471 10446 10421 10396 105 23 23054 232012 21970 121928 21887 21885 21885 2180 231762 21730 21679 21638 21596 29 10199 10175 10151 10126 10102 105 2010 2180 21769 21238 21887 21845 28 10347 10322 10297 10275 10248 105 2010 2123 21269 21228 21187 21147 21106 31 09909 09885 09861 09837 09813 09957 11049 10495 | 19  | 24413                        | 24367    | 24322 | 24276   | 24231  |                | 13        | 11734    | 11708   | 11081  | 11654  | 11628 |          |
| 22 23605 23560 23516 23472 23428 2384 22 11259 11233 11207 11181 11155 111 23 233940 23296 23252 23299 23165 23122 23 11104 11078 11052 11057 11001 1071 24 23078 23035 22991   229294 22905 22867 22604 25 10797 10772 10746 10721 10686 106 25 22819 22775 22732 22690 22647 22604 25 10797 10772 10746 10721 10686 106 26 222519 22476 22433 22391 22349 26 10646 10620 10595 10570 10545 100 27 22306 22524 22012 21970   21928 21887 21845 28 10347 10322 10297 10272 10248 103 28 22054 22012 21970   21928 21887 21845 28 10347 10322 10297 10272 10248 103 29 21803 21762 21720 21679 21638 21596 29 10199 10175 10151 10196 10102 102 30 0.21555 21514 21473 21492 21391 21360 30 0.10053 10029 10005 09981 09957 0931 21309 21269 21228 21187 21147 21106 31 09909 09885 09861 09837 09813 0937 09813 22 10666 21025 20985 20945 20905 20864 32 09765 09741 09718 09694 09670 096 33 20824 20784 20744 20704 20665 20625 33 09623 09599 09576 09552 09529 0336 20348 20395 20250 20230 20191 20162 35 09343 09319 0996 09273 09250 0230 20191 20162 35 09343 09319 0996 09273 09250 0230 20191 20162 35 09343 09319 0996 09273 09250 0230 20191 20162 35 09343 09319 0996 09273 09250 09230 30191 20162 35 09343 09319 0996 09273 09250 09230 09251 19800 19811 19803 19764 19726 19687 37 09067 08774 08752 08750 08866 08864 08842 088 1949 19611 19803 19764 19726 19687 37 09067 08774 08752 08750 08755 08751 08537 08536 08114 0834 18301 18894 18857 18804 18804 18805 18804 18805 18804 18805 18804 18805 18804 18805 18804 18805 18804 18805 18804 18805 18804 18805 18805 18804 18805 18804 18805 18805 18807 18705 17700 17705 17701 17701 17705 17701 17705 17707 17707 17707 17707 17707 17707 17707 1770 17707 177 | 20  |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 23] 23340 29296 23252 23209 23165 23192 233 11104 11078 11052 11027 11001 105 24 23078 23035 22991 22948 22905 22862 24 10950 10924 10899 10873 10848 10656 107 25 22561 22519 22476 22433 22391 22349 26 10646 10620 10595 10570 10545 105 27 22306 22264 22922 22180 22138 22096 27 10495 10471 10446 10421 10396 105 28 22054 22012 21970 21928 21887 21845 28 10347 10322 10297 10272 10248 105 29 21803 21762 21720 21679 21638 21596 29 10199 10175 10151 10196 10102 105 30 0.21555 21514 21473 31432 21391 21360 30 0.10053 10029 10005 09981 09957 095 31 21309 21269 21228 21187 21147 21106 31 09909 09885 09861 09837 09813 093 32 21066 21025 20985 20945 20905 20864 32 09765 09741 09718 09864 09670 833 20824 20784 20744 20704 20665 20625 33 09623 09599 09576 09552 09559 09536 34 20585 20345 20905 20865 20625 33 09623 09599 09576 09576 09552 0959 0953 34 20585 20345 20309 20250 20191 20152 35 09943 09319 09296 09237 09250 093 36 20113 20074 20053 19996 19957 19919 36 0920 09886 0861 09837 09313 0936 20113 20074 20053 19996 19957 19919 36 0920 09459 09435 09412 09389 0936 20113 20074 20053 19966 19957 19919 36 0920 09459 09435 09412 09389 0936 0936 0936 0936 0936 09373 09412 09389 0936 0936 0936 0936 0936 09373 09250 093 0936 0936 0936 0936 09373 09250 093 0936 0936 0936 09373 0936 0936 09373 0936 0936 09373 0936 0936 09373 0936 0936 09373 0936 0936 09373 0936 09373 0936 0936 09373 0936 09373 0936 09374 0938 0936 09373 0936 09374 0938 0936 0936 09373 0936 09374 0938 0936 09373 0936 09374 0938 0936 09374 0938 0936 09374 0938 09374 0938 0938 0936 09374 0938 0936 09374 0938 0938 0938 0938 0938 0936 0936 09374 0938 0938 0938 0938 0938 0938 0938 0938  |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 24 29078 29075 22791   22948   22905   22862   24   10950   10924   10899   10873   10848   10855   10856   10 |     |                              |          |       |         |        |                | , ,       |          |         |        |        |       |          |
| 25   |     |                              |          |       |         |        |                |           |          |         |        |        |       | 10975    |
| 25   |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 27 22306 22264 2222 22180 22138 22096 27 10495 10471 10446 10421 10396 105 28 22054 22012 21970 21928 21887 21845 28 10347 10322 10297 10272 10248 100 21020 21809 21809 21762 21720 21679 21688 21596 29 10199 10175 10151 10126 10102 100 2100 2100 21555 21514 21473 21432 21391 21350 30 0.10053 10029 10005 09981 09987 09811 21309 21269 21228 21187 21147 21106 31 09909 09885 09861 09837 09813 0932 21066 21025 20985 20945 20905 20864 32 09765 09741 09718 09694 09670 09633 20824 20784 20744 20704 20665 20625 33 09623 09599 09576 09552 09529 0934 20585 20345 20506 20466 20427 20387 34 09482 09459 09459 09415 09412 09389 0835 20345 20509 20220 20191 20152 35 09343 09319 09296 09273 09250 0936 20113 20074 20035 19996 19957 19919 36 09204 09181 09158 09136 09113 090 09159 19959 19957 19919 36 09204 09181 09158 09169 09130 09205 19940 19382 19944 19306 19269 19231 39 08797 08774 08752 08730 08708 084 18857 18809 18878 18948 18931 18859 18754 18950 19269 19231 39 08797 08774 08752 08730 08708 084 18505 18508 18508 18508 18508 18508 18053 18017 17981 17945 17905 45 08015 07994 07973 07952 07931 0755 17660 17625 17509 17554 17519 17484 47 07765 07744 07725 07753 07357 073 |     |                              |          |       |         |        |                |           |          |         |        |        |       | 10520    |
| 28   |     |                              |          |       |         |        |                |           |          |         |        |        |       | 10371    |
| 29 21803 21762 21720 21679 21638 21596 29 10199 10175 10151 10126 10102 100 30 0.21535 21514 21473 31432 21391 21360 30 0.10053 10029 10005 09981 09957 095 31 21309 21269 21228 21187 21147 21106 31 09909 09885 09861 09837 09813 093 32 21066 21025 20985 20945 20905 20864 32 09765 09741 09718 09694 09670 096 33 20824 20784 20744 20704 20665 20625 33 09623 09599 09459 09455 0952 0953 34 20585 20345 20506 20466 20427 20387 34 09482 09459 09459 09455 09412 09389 083 35 20348 20309 20269 20230 20191 20152 35 09343 09319 09296 09273 09250 093 36 20113 20074 20035 19996 19957 19919 36 09204 09181 09156 09136 09136 09136 09136 09136 09136 09141 19803 19764 19726 19687 37 09067 09044 09022 08999 0876 0853 38 19649 19611 19572 19594 19496 19458 38 08931 08909 08886 08864 08842 088 39 19420 19382 19344 19306 19269 19231 39 08797 08774 08752 08730 08708 086 40 0.19193 19156 19118 19081 19091 18093 19458 38 08931 08509 08886 08864 08842 088 41 18968 18931 18894 18857 18820 18783 41 08531 08501 08488 08466 08444 084 18505 18269 18233 18197 18161 18124 44 0843 08271 08200 08079 08058 08864 08844 084 18306 18269 18233 18197 18161 18124 44 08143 08121 08100 08079 08058 084 17414 17379 17394 17394 17399 17484 47 07765 07744 07730 07952 07931 075 07140 17293 17205 17170 17135 17101 17066 49 07518 07498 07478 07458 07437 0745 07458 07437 0745 07458 07459 07579  |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| \$\begin{array}{c c c c c c c c c c c c c c c c c c c  |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 31         21309         21269         21289         21187         21147         21106         31         09909         09885         09861         09837         09813         09730           32         21066         21025         20985         20945         20905         20864         32         09765         09741         09718         09694         09670         0963           34         20345         20305         20466         20427         20387         34         09482         09459         09459         09569         09552         09559         09552         09559         09556         09566         09683         09482         094459         09459         09459         09451         09389         0956         09552         09569         09552         09569         09566         09566         09456         09459         09459         09451         09489         09489         09868         09412         09889         0956         09571         09949         09686         09142         09686         09241         09089         09866         09868         09481         09451         09461         09686         096866         088864         08848         08481         08481         09   |     |                              |          |       |         |        |                | <b></b> ' |          |         |        |        |       |          |
| 32         21066         21025         20985         20945         20905         20864         32         09765         09741         09718         09694         09670         096           33         20824         20784         20744         20704         20665         20625         33         09623         09599         09576         09572         09529         09230           34         20388         20309         20269         20230         20191         20152         35         09343         09319         09260         09273         09250         09230         0931         09686         09273         09250         09250         09230         09191         20152         35         09343         09319         09296         09273         09250         09230         09136         09136         09136         09136         09136         09136         09136         09136         09136         09136         09136         09136         09261         08261         08481         08466         08842         088         08866         08866         08864         08862         08866         08866         08866         08862         08867         08876         0827         08777         08777   |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 33 20824 20784 20784 20704 20665 20625 33 09623 09599 09576 09552 09529 09534 20506 20466 20427 20387 34 09482 09459 09435 09412 09389 0935 20348 20309 20290 20290 20191 20152 35 09343 09319 09296 09273 09250 09366 20113 20074 20035 19996 19957 19919 36 09204 09181 09158 09118 09158 09113 0905 37 19880 19841 19803 19764 19726 19687 37 09067 09044 09022 08999 08976 085 38 19649 19611 19572 19594 19496 19458 36 08931 08909 08886 08864 08842 086 39 19420 19382 19944 19306 19269 19231 39 08797 08774 08752 08730 08708 086 0861 08619 08575 095 0959 09576 0959 09576 09113 0959 09586 0866 08644 08612 086 0959 19591 19591 19592 19593 19594 19596 19458 36 09591 08597 08575 085 08597 08730 08708 086 0861 08619 08575 08597 08730 08708 086 0861 08619 08575 08597 08730 08708 086 0861 08619 08575 08597 08757 08750 |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 34         20585         20345         20506         20466         20427         20387         34         09482         09489         09435         09412         09389         093           35         20348         20309         20269         20230         20191         20152         35         09343         09319         09296         09273         09250         092           36         20113         20074         20035         19964         19726         19687         37         09067         09044         09022         08999         08966         088           37         19800         19841         19872         19564         19796         19458         36         08931         08909         08866         08842         08842         08842         08842         08842         08842         08842         08842         08842         08842         08842         08842         08842         08842         08842         08846         08844         08842         08842         08846         08444         08848         08466         08444         08848         08466         08444         08848         08466         08444         08848         08466         08444         088466   |     |                              |          |       |         |        |                | 1         |          |         |        |        |       | 09506    |
| 35 20348 20309 20260 20230 20191 20152 35 09343 09319 09296 09273 09250 09236 20113 20074 20035 19996 19957 19919 36 09204 09181 09158 09158 09158 09159 19841 19803 19764 19726 19687 37 09067 09044 09022 08999 08976 0838 19649 19611 19572 19694 19496 19458 38 08931 08909 08866 08864 08862 08863 19420 19382 19344 19306 19269 19231 39 08797 08774 08752 08730 08708 0804 18904 18905 19881 18908 18931 18894 18857 18820 18783 41 08531 08510 08488 08466 08444 0842 18746 18709 18672 18635 18598 18561 42 08401 08379 08357 08336 08314 0844 18306 18259 18233 18197 18161 18124 44 08143 08121 08100 08079 08058 0844 18306 18259 18233 18197 18161 18124 44 08143 08121 08100 08079 08058 0844 18306 18259 18233 18197 18161 18124 44 08143 08121 08100 08079 08058 0844 17660 17625 17750 17554 17519 17696 46 07889 07868 07848 07827 07806 07764 17639 17239 17205 17170 17135 17101 17066 49 07518 07498 07478 07455 07537 07557 07559 07559 07559 07559 16622 16588 16524 16690 16636 51 07277 07257 0 |     |                              |          |       |         |        |                |           |          |         |        |        |       | 09366    |
| 36 20113 20074 20035 19996 19957 19919 36 09204 09181 09138 09136 09136 09137 19880 19841 19803 19764 19726 19687 37 09067 09044 09022 08999 08976 0883 19649 19611 19572 19694 19496 19458 38 08931 08909 08866 08864 08842 08831 19420 19382 19944 19906 19269 19231 39 08797 08774 08752 08730 08708 08708 08709 19420 19382 19944 19906 19269 19231 39 08797 08774 08752 08730 08708 08708 08709 19420 19382 18944 18950 18672 18680 18680 18681 08466 08444 0840 18950 18672 18682 18598 18561 42 08401 08379 08357 08336 08344 08543 18525 18488 18451 18415 18378 18382 43 08271 08250 08298 08207 08185 08144 18306 18269 18233 18197 18161 18124 44 08143 08121 08100 08079 08058 08447 18306 18269 18233 18197 18161 18124 44 08143 08121 08100 08079 08058 0845 18089 18053 18017 17981 17945 17909 45 08015 07994 07973 07952 07931 07504 17760 17650  |     |                              |          |       |         |        |                |           |          |         |        |        |       |          |
| 37         19880         19841         19803         19764         19726         19687         37         09067         09044         09022         08999         08976         085           38         19649         19611         19572         19594         19496         19486         38         08931         08909         08866         08646         08642         086           40         0.1913         19156         19118         19081         19091         19093         19764         08777         08777         08730         08730         08757         087           41         18968         18931         18894         18857         18820         1800         18783         41         08531         08510         08488         08466         08444         0844           42         18766         18709         18672         18635         18598         18561         42         08401         08379         08357         08336         08314         08531         08101         08488         08466         08444         08448         08466         08449         08454         1848         18451         18415         18378         18942         43         08271         08250 </td <td></td> <td>09090</td>  |     |                              |          |       |         |        |                |           |          |         |        |        |       | 09090    |
| 38         19649         19611         19572         19534         19496         19458         36         08931         08909         08866         08842         084         08780         08708         08707         08777         08777         08757 </td <td></td> <td>- 01. 64</td>   |     |                              |          |       |         |        |                |           |          |         |        |        |       | - 01. 64 |
| 39         19420         19382         19344         19306         19269         19281         39         08797         08797         08752         08730         08708         061           40         0.19193         19156         19118         19081         19043         19006         40         0.04664         08641         08619         08597         08575         085         08466         08444         08466         08444         08466         08444         08466         08444         08466         08444         08466         08444         08466         08444         08466         08488         08466         08444         08466         08444         08466         08444         08466         08444         08466         08444         08466         08444         08466         08444         08466         08481         08466         08481         08466         08444         08466         08481         08466         08481         08466         08481         08466         08481         08466         08481         08466         08481         08466         08481         08466         08481         08466         08481         08466         08481         08466         084917         08466         084812  |     |                              |          |       |         |        |                | 36        |          |         |        |        |       | 08819    |
| 41       18968       18931       18894       18857       18820       18783       41       08531       08510       08488       08466       08444       08441         42       18746       18799       18635       18598       18561       42       08401       08379       08357       08336       08314       08441         43       18525       18488       18451       18315       18378       18942       43       08271       08250       08288       08207       08185       081         44       18306       18269       18233       18197       18161       18124       44       08143       08127       08070       08079  |     |                              | 19382    | 19944 | 19306   | 19269  | 19231          | 39        |          | 08774   | 08752  | 08730  | 08708 | 08686    |
| 41       18968       18931       18894       18857       18820       18783       41       08531       08510       08488       08466       08444       08441         42       18746       18799       18635       18598       18561       42       08401       08379       08357       08336       08314       08441         43       18525       18488       18451       18315       18378       18942       43       08271       08250       08288       08207       08185       081         44       18306       18269       18233       18197       18161       18124       44       08143       08127       08070       08079  | -40 | 0 10100                      | 10150    | 10119 | 10091   | 10040  | 10000          | 40        | 0.00004  | 00041   | 09810  | 09.507 | 08575 | 08559    |
| 42         18746         18709         18672         18635         18598         18561         42         08401         08379         08357         08336         08514         084         18525         18488         18451         18415         18378         18378         18382         43         08271         08281         08297         08185         081         08143         08121         08100         08079         08059         08079         08059         08079         08058         084         08183         08121         08100         08079         08058         084         08183         08121         08100         08079         08059         080679         08058         084         08015         07994         07930         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952         07931         07952  |     |                              | <b>L</b> |       |         |        |                |           |          |         |        |        | 08444 | 08492    |
| 43 18525 18488 18451 18415 18378 18942 43 08271 08250 08228 08207 08185 081 44 18306 18269 18233 18197 18161 18124 44 08143 08121 08100 08079 08058 084 45 18089 18053 18017 17981 17945 17909 45 08015 07994 07937 07952 07931 07954 46 17874 17838 17802 17767 17731 17696 46 07889 07868 07848 07827 07806 077 47 17660 17625 17590 17554 17519 17484 47 07765 07744 07723 07703 07682 0764 48 17449 17414 17379 17344 17309 17274 48 07641 07620 07600 07579 07559 07549 17239 17205 17170 17135 17101 17066 49 07518 07498 07478 07458 07437 0745 50 0.17032 16997 16963 16928 16894 16860 50 0.07397 07377 07357 07337 07317 07357 16622 16588 16554 16520 16487 16453 52 07158 07138 07119 07099 07079 07053 16419 16386 16352 16919 16285 16252 53 07040 07021 07001 06982 06982 06965 54 16219 16186 16152 16119 16086 16053 54 06523 06904 06885 06866 06846 0655 15602 15987 15954 15920 15888 15856 55 06808 06789 06770 06751 06731 06581 15402 15595 15593 15593 15593 15498 15496 57 06680 06541 06543 06524 06505 06541 06541 06691 06681 0656 57 15628 15592 15595 15593 15390 15388 15396 15974 58   |     |                              |          |       |         |        |                |           |          |         |        |        |       | 08298    |
| 44 18306 18269 18233 18197 18161 18124 44 08143 08121 08100 08079 08058 080 0805 18089 18053 18017 17981 17945 17909 45 08015 07994 07973 07952 07931 078 08058 18089 18053 18017 17981 17945 17909 45 08015 07994 07973 07952 07931 078 08058 080 08058 080 08058 08059 17484 47 07765 07764 07763 07763 07680 07763 07680 07764 07763 07763 07763 07681 07681 07681 07682 07680 07579 07 |     |                              |          |       |         |        |                |           |          |         |        |        |       | 08164    |
| 45         18089         18053         18017         17981         17945         17999         45         08015         07994         07973         07952         07931         0754           46         17874         17881         17902         17767         17771         17731         17696         46         07889         07868         07783         07827         07802         07764           47         17660         17625         17575         17519         17484         47         07765         07744         07723         07703         07632         07620         07763         07763         07763         07763         07763         07763         07763         07763         07763         07763         07763         07763         07763         07763         07763         07659         07763         07659         07763         07641         07640         07620         07660         07759         07579         07579         07579         07579         07579         07757         0748         0748         07487         0748         07478         07458         07437         07377         07377         07377         07377         07377         07377         07377         07377         07377<   |     |                              |          |       |         |        |                |           |          |         |        |        |       | 08036    |
| 46 17874 17838 17802 17767 17731 17696 46 07889 07868 07848 07827 07806 077 47 17660 17625 17590 17554 17519 17484 47 07765 07774 07723 07703 07682 076 48 17449 17414 17379 17344 17309 17274 48 07641 07620 07600 07579 07579 075 49 17239 17205 17170 17135 17101 17066 49 07518 07498 07498 07458 07437 074 50 0.17032 16997 16963 16928 16894 16860 50 0.07397 07377 07357 07337 07317 073 51 16826 16792 16588 16524 16520 16487 16453 52 07138 07138 07119 07099 07079 52 16622 16588 16554 16520 16487 16453 52 07138 07138 07119 07099 0709 070 53 16419 16386 16552 16319 16285 16252 53 07040 07021 07010 06982 06962 065 54 16219 16186 16152 16119 16386 16053 54 06923 06904 06885 06865 06846 061 55 16020 15387 15398 15593 15593 15593 15593 15498 15466 57 06580 06561 06543 06543 06593 06674 06656 06637 06618 065 57 15628 15595 15563 15590 15388 15396 15498 15466 57 06580 06561 06543 065 |     |                              |          |       |         |        |                |           |          |         |        |        |       | 07910    |
| 47     17660     17625     17590     17554     17519     17484     47     07765     07744     07723     07703     07682     07641       48     17449     17414     17379     17344     17309     17274     48     07641     07620     07600     07579     07559     075       49     17239     17205     17170     17195     17101     17066     49     07518     07498     07478     07458     07437     0745       50     0.17032     16997     16963     16928     16894     16860     50     0.07377     07377     07337     07337     07317     0717       51     16826     16572     16581     16524     16690     16487     16453     52     07138     07138     07119     07099     07099     07099     07099     07099     07099     07099     07099     07040     07021     07010     06982     06962     06865     06865     06865     06866     06866     06866     06866     06866     06866     06866     06866     06866     06866     06731     06731     06731     06731     06731     06731     06731     06732     06524     06524     06524     0654   |     |                              |          | 1 .   | 17767   |        |                |           |          |         |        | 07827  | 07806 |          |
| 49 17239 17205 17170 17135 17101 17066 49 07518 07498 07478 07458 07437 074  500.17032 16997 16963 16928 16894 16860 50 0.07397 07377 07357 07337 07317 075  51 16826 16792 16758 16724 16690 16656 51 07277 07257 07237 07217 07197 071  52 16622 16588 16554 16520 16487 16453 52 07158 07138 07119 07099 07079 075  53 16419 16386 16552 16319 16285 16252 53 07040 07021 07001 06982 06962 065  54 16219 16186 16152 16119 16086 16053 54 06923 06904 06885 06865 06846 066  55 16020 15987 15954 15920 15888 15856 55 06808 06789 06790 06751 06731 06731  56 15823 15790 15758 15725 15692 15600 56 06693 06674 06656 06524 06505 06688 06789 06790 06751 06731 06 | 47  | 17660                        | 17625    | 17590 |         | 17519  |                |           |          |         | 07723  | 07703  |       | 07661    |
| 50 0.17032 16997 16963 16928 16894 16860 50 0.07397 07377 07357 07337 07317 07551 16826 16792 16758 16724 16690 16656 51 07277 07257 07257 07297 07217 07197 |     |                              |          |       |         |        |                |           |          |         |        |        |       | 07539    |
| 51 16826 16792 16758 16724 16690 16656 51 07277 07257 07257 07217 07197 077 07257 16622 16588 16554 16520 16487 16453 52 07158 07138 07119 07099 07079 07053 16419 16386 16352 16919 16285 16252 59 07040 07021 07001 06982 06962 065 16219 16186 16152 16119 16086 16053 54 06923 06904 06885 06865 06846 065 15823 15790 15758 15725 15892 15806 56 06808 06789 06770 06751 06731 067 15805 15828 15758 15758 15758 15758 15892 15806 57 06683 06674 06656 06637 06618 065 15828 15595 15563 15593 15498 15496 57 06580 06561 06543 06524 06505 06693 06674 06688 06693 06674 06688 06693 06694 06688 06693 06694 06688 06693 06694 06688 06693 06694 06688 06693 06694 06688 06693 06694 06888 06982 0698 | 49  | 17239                        | 17205    | 17170 | 17135   | 17101  | 17 <b>06</b> 6 | 19        | 07518    | 07498   | 07478  | 07458  |       | 07417    |
| 51 16826 16792 16758 16724 16690 16656 51 07277 07257 07257 07217 07197 077 07257 16692 16588 16554 16552 16487 16453 52 07158 07138 07119 07099 07079 070 070 070 070 070 070 07  | 50  | 0.17032                      | 16997    | 16963 | 1,6928  | 16894  | 16860          | 50        | 0.07397  | 07377   | 07357  | 07337  | 07317 | 0729     |
| 52         16622         16588         16554         16520         16487         16453         53         07138         07138         07139         0709   |     |                              |          |       |         |        |                |           |          |         | -      |        | 07197 | (07178)  |
| 53 16419 16386 16352 16319 16285 16252 53 07040 07021 07001 06982 06962 06565  |     |                              |          |       |         |        |                |           |          |         |        |        | 07079 | 07060    |
| 55 16020 15987 15954 15920 15888 15856 55 06808 06789 06770 06751 06731 067 1560 15823 15780 15758 15725 15892 15600 56 06693 06674 06656 06637 06618 065 15828 15595 15563 15593 15498 15496 57 06580 06543 06524 06524 06505 066 158 15498 15499 15570 15338 15306 15974 58 06569 06440 06443 06543 06594  | 53  | 16419                        | 16386    |       |         | 16285  | 16252          | 53        |          | 07021   | 07001  | 06982  | 06962 | ()6945   |
| 56 15828 15790 15758 15723 15692 15660 56 06693 06674 06656 06637 06618 065 1560 1560 1560 1560 1560 1560 1560   |     |                              |          |       |         |        |                |           |          |         |        |        | 06846 | 06827    |
| 57 15628 15595 15563 15530 15498 15466 57 06580 06561 06543 06524 06505 068 158 15434 15402 15338 15306 15874 58 06469 06431 06412 06394 065   |     |                              |          |       |         |        |                |           |          |         |        |        | 06731 | 06400    |
| 58 15494 15402 15370 15338 15306 15874 58 06469 06440 06431 06412 06394 06   |     |                              |          |       |         |        |                |           | ,        |         |        |        |       | OC 497   |
| 50   15949   15910   15178   15146   15115   15109   50   16057   160649   06449   06431   06412   06399   160649   160649   06431   06412   06399   160649  |     |                              |          |       |         |        |                |           | 1        |         |        |        |       | 06375    |
|  |     |                              |          |       |         |        |                |           | 06468    | 06449   | 06431  | 00412  | 06090 | 06265    |
| The part of the properties of the steam of the properties the part of the part | 29  | 15242                        | 15210    | 101/8 | [ 15130 | 15115  | 15083          | 11 59     | 06357    | 1 06238 | 100320 | 00:502 | 00200 |          |

TABLE XXXV.

. 169 TO FIND THE LATITUDE BY DOUBLE ALTITUDES, AND THE ELAPSED TIME.

| _        |                |                |                        | Argu           | ment.          | HALF                   | EI       | APSED          | TIME           | <del></del> ,  |                |                        |       |
|----------|----------------|----------------|------------------------|----------------|----------------|------------------------|----------|----------------|----------------|----------------|----------------|------------------------|-------|
|          |                |                | 4 Ho                   |                |                |                        | T        |                |                | 5 Ho           | ours.          |                        |       |
| M.       | 0"             | 10"            | 20"                    | 30"            | 40"            | 50"                    | M.       | υ"             | 10"            | 20"            | 30″            | 40″                    | 50    |
| 0        | 0.06247        | 06229          | 06211                  | 06192          | 06174          | 06156                  | 0        | 0.01506        | 01497          | 01489          | 01480          | 01472                  | 0140  |
| 1        | 06138          | 06120          | 06102                  |                | 06066          | 06048                  | Ĭ        | 01455          | 01447          | 01439          | 01430          | 01422                  | 014   |
| 2        | 06030          | <b>Q601</b> 2  | 03995                  | 05977          | 05959          | 05941                  | 2        | 01406          | 01398          | 01890          | 01381          | 01373                  | 0136  |
| 3        | 05924          | 059.16         | 05888                  | 05871          | 05853          | 05836                  | 3        | 01357          | 01349          | 01341          | 01333          | 01325                  | 0131  |
| 4        | 05818          | 05801          | 05783                  |                | 05748          | 05731                  | 4        |                |                | 01294          | 01286          | 01278                  | 012   |
| 5        | 05714<br>05610 | 05696<br>05593 | 05679<br>05576         | 05662<br>05559 | 05645<br>05542 | 05627<br>05525         | 5<br>6   |                | 01255<br>01209 | 01247<br>01202 | 01240<br>Q1194 | 01232<br>01187         | 0125  |
| 7        | 05508          | 05491          | 05474                  | 05457          | 055440         | 05423                  | 7        | 01172          |                | 01157          | 01150          | 01142                  |       |
| 8        | 05406          | 05389          | 05373                  | 05356          | 05340          | 05323                  | 8        | 01128          |                | 01113          | 01106          | 01099                  |       |
| . 9      | 05306          | 05290          | 05273                  | 05257          | 05240          | 05224                  | 9        | 01084          |                | 01070          | 01063          | 01056                  |       |
| 10       | 0.05207        | 05191          | 05174                  | 05158          | 05142          | 05125                  | 10       | 0.01042        | 01035          | 01028          | 01021          | 01014                  | 0100  |
| 11       | 05109          | 05093          | 05076                  |                | 05044          | 05028                  | 11       | 01000          | 00993          | 00987          | 00980          | 00973                  | 0096  |
| 12       | 05012          | 04996          | 04980                  | 04964          | 04948          | 04932                  | 12       | 00960          | 00953          | 00946          | 00940          | 00933                  | 0091  |
| 13       | 04916          | 04900          | 04884                  | 04868          | 04852          | 04837                  | 13       | 00920          | 00913          | 00907          | 00900          | 00894                  | 3800  |
| 14       | 04821<br>04727 | 04805<br>04711 | 04789                  | 04774          | 04758          | 04743<br>04649         | 14<br>15 | 00881          | 00874<br>00836 | 00868<br>00830 | 00862<br>00824 | 008 <i>55</i><br>00818 |       |
| 15       | 04634          | 04619          | 04696<br>04603         | 04680<br>04588 | 04665<br>04573 | 04557                  | 16       | 00843<br>00805 | 00799          | 00793          | 00024          | 00781                  | -0077 |
| 17       | 04542          | 04527          | 04512                  | 1)41-196       | 04481          | 04466                  | 17       | 00769          | 00763          | 00757          | 00751          | 00745                  | 0075  |
| 18       | 04451          | 04436          | 04421                  | 04406          | 04391          | 04376                  | 18       | 00733          | 00728          | 00721          | 00716          | 00710                  | 0070  |
| 19       | <b>04</b> 361  | 04346          | 04332                  | 04317          | 04302          | 04287                  | 19       | 00699          | 00693          | 00687          | 00682          | 00676                  | 0067  |
| 20       | 0.04272        | 04258          | 04243                  | 04228          | 04214          | 04199                  | 20       | 0.00665        | 00659          | 00654          | 00648          | 00643                  | 006:  |
| 21       | 04185          | 04170          | 04155                  | 04141          | 04127          | 04112                  | 21       | 00632          | 00626          | 00621          | 00616          | 00610                  | 0060  |
| 22       | 04098          |                | 04069                  | 04055          | 04040          | 04026                  | 22       | 00600          | 00594          | 00589          | 00584          | 00579                  | 0057  |
| 23       | 04012          | 03998          | 03983                  | 03969          | 03955          | 03941                  | 23       | 00568          | 00563          | 00558          | 00553          | 00548                  | 0054  |
| 24<br>25 | 03927<br>03843 | 03913<br>03829 | 03899<br>0381 <i>5</i> | 03885<br>03802 | 03871<br>03788 | 03857<br>03774         | 24 25    | 00538          | 00538<br>00504 | 00528<br>00499 | 00523<br>00494 | 00518<br>00489         | 0051  |
| 26       | 03760          | 03746          | 03733                  |                | 03706          |                        | 26       | 00508          | 00304          | 00499          | 00466          | 00461                  | 004   |
| 27       | 03678          | 03665          | 03651                  | 03638          | 03624          | 03611                  | 27       | 00452          | 00447          | 00443          | 00438          | 00434                  |       |
| 28       | 03597          | 03584          | 03571                  | 03557          | 03544          | 03531                  | 28       | 00425          | 00420          | 00416          | 00412          | 00407                  | 0040  |
| 29       | 03517          | 03504          | 03491                  | 03478          | 03465          | 03452                  | 29       | 00399          | 00394          | 00390          | 00386          | 00382                  | 003   |
| 30       | 0.03438        | 03425          | 03112                  | 03399          | 03386          | 03373                  | 30       | 0.00373        | 00369          | 00365          | 00361          | 00357                  | 003.  |
| 31       | 03360          | 03348          | 03335                  | 03322          | 03309          | 03296                  | 31       | 00349          | 00345          | 00341          | 00837          | 00333                  | 0031  |
| 32       | 03283          | 03271          | 03258                  | 03245          | 03235          | 03220                  | 32       | 00325          | 00321          | 00317          | 21800          | 00310                  | 0030  |
| 33       | 03207          | 03195          | 03182                  | 03170          | 03157          | 03145                  | 33       | 00302          | 00298          | 00295          | 00291          | 00287                  | 0028  |
| 34<br>35 | 03132<br>03058 | 03120<br>03046 | 03107<br>030 <b>34</b> |                | 03083          | 08070<br>02997         | 34       | 00280          | 00276          | 00273          | 00269          | 00266                  | 0024  |
| 36       | 02985          | 02973          | 02961                  | 02949          | 02937          | 02925                  | 35<br>36 | 00259<br>00259 | 00255<br>00235 | 00252<br>00232 | 00249<br>00229 | 00245<br>00225         | 0025  |
| 37       | 02913          | 02901          | 02889                  | 02877          | 02865          | 02858                  | 37       | 00239          | 00235          | 00232          | 00210          | 00207                  | 0020  |
| 38       | 02841          | 02829          | 02818                  | 02806          | 02794          | 02785                  | 38       | 00200          | 00197          | 00194          | 00191          | 00188                  | 0018  |
| 39       | 02771          | 02759          | 02748                  | 02736          | 02724          | 02713                  | 39       | 00183          | 00180          | 00177          | 00174          | 00171                  | 0014  |
| 40       | 0.02701        | 02690          | 02678                  | 02667          | 02656          | 02644                  | 40       | 0.00166        | 00163          | 00160          | 00157          | 00155                  | 001.  |
| 41       | 02633          | 02622          | 02610                  | 02599          | 02588          | 02577                  | 41       | 00149          | 00147          | 00144          | 00142          | 00139                  |       |
| 42       | 02565          | 02554          | 02543                  | 02532          | 02521          | 02510                  | 42       | 00134          | 00132          | 00129          | 00127          | 00124                  | 001:  |
| 43       | 02499          | 02488          | 02477                  |                | 02455          | 02444                  | 43       | 00120          | 00117          | 00115          | 00113          | 00110                  |       |
| 44       | 02433<br>02368 | 02422<br>02357 | 02411<br>02347         | 02400<br>02336 | 02390<br>02326 | 02379<br>0231 <i>5</i> | 44       | 00106          | 00104          | 00102          | 00099          | 00097                  |       |
| 46       | 02304          | 02394          | 02283                  | 02336          | 02320          | 02313                  | 45<br>46 |                | 00091          | 00089          | 00087          | 00085<br>00074         | .000  |
| 47       | 02241          | 02231          | 02221                  | 02210          | 02200          | 02190                  | 47       | 00070          |                | 00066          | 00065          | 00063                  | 0006  |
| 48       | 02179          |                | 02159                  | 02149          | 02139          | 02128                  | 48       | 00060          | 00058          | 00056          | 00055          | 00053                  | 000   |
| 49       | 02118          | 02108          | 02098                  | 02088          | 02078          | 02068                  | 49       | 00050          | 00049          | 00047          | 00046          | 00044                  | 0004  |
|          | 0.02058        |                |                        |                |                | 02009                  | 50       | 0.00041        | 00040          | 00039          | 00037          | 00036                  |       |
| 51       | 01999          | 01989          | 01979                  | 01969          | 01960          | 01 <b>95</b> 0         | 51       | 00033          | 00032          | 00031          | 00030          | 00029                  | CO0:  |
| 52       |                | 01931          |                        | 01912          |                | 01892                  |          |                |                |                |                |                        |       |
| 53<br>54 |                | 01873          |                        | 01854          |                |                        |          |                |                | C0018          |                |                        |       |
| 55<br>55 |                | 01817<br>01761 |                        | 01798<br>01743 |                | 01780<br>01725         |          |                |                | 00013          |                |                        |       |
| 56       |                |                |                        | 01689          |                | 01723                  | 56       |                |                | £00009         |                |                        |       |
| 57       |                |                |                        | 01635          |                | 01618                  |          |                |                | 00003          |                | 00002                  |       |
| 58       | _01609         | 01600          | 01591                  | 01583          | 01574          | 01565                  | 58       | 00002          | 00001          | 00001          | CO001          | 00001                  | 000   |
| 59       | 01557          | 01548          | 01540                  | 01531          | 01523          | 01514                  | 59       | 00000          |                |                | 00000          | 00000                  | 000   |
|          |                |                |                        |                |                |                        |          |                |                |                |                |                        |       |

TABLE XXXVI.

|          |                    |                |                |                             | Argume                         | nt. M          | IIDI     | OLE TIN        | Æ.             |                         |                |                |                |
|----------|--------------------|----------------|----------------|-----------------------------|--------------------------------|----------------|----------|----------------|----------------|-------------------------|----------------|----------------|----------------|
| ا۔       |                    |                | 0 H            |                             | <del></del>                    |                |          |                |                | 1 Ho                    |                |                |                |
| VI.      | 0"                 | 10"            | 20"            | 30"                         | 40"                            | 50"            | M.       | 0//            | 10"            | 20"                     | 30"            | 40″            | 50"            |
|          | 0.00000            | 16270          | 46378          | 63982                       | 76476                          | 86167          |          | 4.71403        | 71521          | 71638                   |                | 71872          |                |
|          | 2.94085<br>3.24187 | 00779<br>27663 | 06578<br>30882 | 11694<br>33878              | 16269<br>36681                 | 20408<br>3931a | 1 2      | 72104<br>72793 | 72220<br>72907 | 72335<br>73020          | 72450<br>73133 | 72565<br>73246 |                |
| 3        | 41796              | 44144          | 46371          |                             | 50510                          |                | 3        | 73470          | 73582          | 73694                   | 73133          | 73240          |                |
| 4        | 54289              | 56061          | 57764          | 59403                       | 60982                          | 62506          | 4        | 74137          | 74247          | 74357                   | 74466          | 74575          |                |
| 5        | 63978              | 65402          | 66731          | 68117                       | 69413                          |                | 5        | 74792          | 74900          | 75008                   | 75116          | 75223          | 1 .            |
| 6        | 71895              | 73085          | 74242          | 75370                       |                                |                | 6        | 75437          | 75544          | 75650                   |                | 75862          |                |
| 7        | 78588              | 79609          | 80607          | 81583                       | 82537                          | 83471          | 7        | 76072          | 76177          | 76281                   | 76385          | 76489          | <b>7659</b> 3  |
| 8        | 84385              | 85280          | 86157          | 87017                       | 87860                          | 88686          | 8        | 76697          | 76800          |                         | 77006          | 77108          |                |
| 9        | 89498              | 90294          | 91076          | 91845                       | 92600                          | 93341          | 9        | 77312          | 77413          | 77514                   | 77615          | 77716          |                |
| 10<br>11 | 3.94071            | 94788          | 95494          | 96188<br>00136              | 96872                          | 97545          | 10       | 4.77917        | 78017          | 78117                   | 78217          | 78316          |                |
|          | 98207<br>4.01983   | 98860<br>02581 | 99503<br>03172 | 03754                       | 00761<br>04329                 | 01576<br>04896 | 11       | 78514<br>79101 | 78613<br>79198 | 78711<br>79295          | 78809<br>79392 | 78907<br>79488 | 1              |
| 13       | 05456              |                | 06554          |                             |                                | 08251          | 13       | 79680          | 79196          | 79871                   | 79966          | 80061          |                |
| 14       | 08671              | 09184          |                | 10193                       |                                | 11178          | 14       | 80251          | 80345          |                         |                | 80627          | 1              |
| 15       | 11663              | 12142          | 12616          |                             | 13549                          |                | 15       | 80813          | 80906          | 80999                   |                | 81183          |                |
| 16       | 14461              | 14911          | 15355          | 15796                       | 16231                          | 16663          | 16       | 81367          | 81459          | 81550                   | 81641          | 81732          | 81823          |
| 17       | 17090              | 17513          | 17932          | 18346                       | 18757                          | 19164          | 17       | 81914          |                | 82094                   | 82184          |                |                |
| 18       | 19567              | 19967          | 20363          | 20755                       | 21148                          | 21528          | 18       | 82453          | 82542          | 82631                   | 82720          |                |                |
| 19       | 21910              | 22289          | 22664          | 23036                       | 23405                          | 23770          | 19       | 82984          | 83072          | 83160                   | 83247          | 83334          |                |
|          | 4.24333            | 24493          | 24849          | 25209                       | 25553                          | 25901          | 20       |                | 83595          | 83682                   | 83768          |                |                |
| 21       | 26246              |                | 26928          |                             | 27599                          | 27931          | 21       | 84026          | 84111          | 84196                   | 84281          | 84366          |                |
| 22       | 28260              | 28587          | 28911          | 29233                       |                                | 29870          | 22       | 84536          |                | 84704                   |                |                | 1              |
| 29<br>24 | 30185<br>32026     | 30497<br>32326 | 30807<br>32623 | 31115<br>32919              | 31421<br>33212                 | 31725          | 23<br>24 | 85039<br>85536 | 85122<br>85618 | 85205<br>85700          | 85388<br>85782 |                |                |
| 25       | 33793              | 34080          | 34365          | 34649                       |                                | 33503<br>35211 | 25       | 86026          | 86107          | 86188                   |                |                |                |
| 26       | 35489              | 35765          | 36040          | 36918                       | 36584                          | 36853          | 26       | 86510          |                | 86670                   |                | 86820          | 1 1            |
| 27       | 37121              | 37387          | 37651          | 37914                       | 38175                          | 38454          | 27       | 86989          | 87068          | 87147                   | 87226          | 87304          |                |
| 28       | 38692              | 38949          | 39204          | 39457                       | 39709                          | 39960          | 28       | 87460          | 87538          | 87616                   |                | 87772          | 87850          |
| 29       | 40209              | 40456          | 40702          | 40947                       | 41190                          | 41432          | 29       | 87927          | 88004          | 88081                   | 88158          | 88235          | 88311          |
|          | 4.41678            | 41912          | 42150          | 42386                       | 42622                          | 42856          | 1        | 4.88387        | 88463          | 88539                   | 88615          | 88691          | 88767          |
| 31       | 43088              | 43320          | 43550          |                             | 44007                          | 44233          | 31       | 88842          | 88917          | 88992                   | 89067          |                |                |
| 32       | 44459              |                |                | 45127                       | 45348                          | 45568          | 32       | 89291          | 89365          | 89439                   | 89513          | 89587          | 89661<br>90100 |
| 33<br>34 | 45786<br>47073     |                |                | 46434                       |                                | 46861          | 33       | 89735          | 89808          | 89881                   | 89954          |                | 90554          |
| 35       | 48323              | 47284<br>48527 | 47494<br>48731 | 47702<br>48934              |                                | 48117<br>49336 | 34<br>35 | 90173<br>90606 | 90246<br>90678 | 90318<br>907 <i>5</i> 0 | 90390<br>90821 | 90462<br>90892 |                |
| 36       | 49536              |                | 49933          |                             | 50326                          |                | 36       | 91034          |                | 91176                   | 91247          |                | 91387          |
| 37       | 50716              | 50910          | 51102          |                             | 51485                          | 51675          | 37       | 91457          |                | 91597                   | 91667          | 91737          | 91807          |
| 38       | 51864              | 52052          |                |                             | 52612                          | 52797          | 38       | 91876          |                | 92014                   | 92083          | .92152         | 92221          |
| 39       | 52981              | 53165          | 53347          | <i>5</i> 8 <i>5</i> 29      | <i>5</i> 3710                  | 53891          | 39       | 92290          |                | 92426                   | 92494          | 92562          |                |
| 40       | 4.54070            | 54249          | 54427          | 54604                       | 54780                          | 54956          |          | 4.92698        |                | 92834                   | 92901          | 92968          | 93035          |
| 41       | 55131              | 55306          | 55479          | 55652                       | 55824                          |                | 41       | 93102          | 93169          | r <b>1</b>              | 93303          | 93369          | 93435<br>93831 |
| 42       | 56166              |                | 56506          |                             | 56842                          |                | 42       | 93501          | 93567          | 93633                   | 93699          |                | 93831          |
| 44       | 57177<br>58163     |                | 57508<br>58487 | 57673<br>58648              | <i>5</i> 7837<br><i>5</i> 8808 |                | 43<br>44 | 93897<br>94287 | 93962<br>94352 | 94027<br>94417          | 94092<br>94481 | 94157<br>94545 | 94609          |
| 45       | 59127              |                | 59443          | 59600                       | 59757                          | 58968<br>59913 | 45       |                | 94737          | 94801                   | 94865          | 94929          | 94993          |
| 46       | 60069              | 60224          | 60378          | 60532                       | 60685                          |                | 46       |                | 95119          | 95182                   | 95245          | 95308          | 95371          |
| 47       | 60990              | 61141          | 61292          | 61443                       | 61593                          | 61742          | 47       | 95434          |                | 95559                   | 95621          | 95683          | 95745          |
| 48       | 61891              | 62039          | 62187          | 62334                       | 62481                          | 62627          | 48       |                | 95869          | 95931                   | 95993          | 96055          | 96117          |
| 49       | 62773              | 62918          | 63063          | 63207                       | 63351                          | 63494          | 49       |                | 96239          |                         | 96361          | 96422          | 96483          |
|          | 4.63687            |                |                |                             |                                |                |          | 4.96544        |                |                         | 96725          | 96785          | 96845          |
| 51       |                    | 64622          |                |                             |                                |                | 51       |                |                | 97026                   | 97086          | 97145          | 97201          |
| 52       |                    | 65448          | 65584          |                             | 65855                          |                | 52       |                | 97323          |                         | 97442          | 97501          | 07011          |
| 58<br>54 |                    | 66259<br>67058 | 66392          |                             |                                | 66790          | 53       | 97618          |                | 97736                   | 97794<br>98143 | 97853          | 98259          |
| 55       |                    | 67852          | 67184<br>67961 | 67314<br>680 <del>8</del> 9 | 67444<br>68217                 |                | 54<br>55 |                | 98027          |                         | 98143          | 08546          | 98603          |
| 56       | 68871              |                | 68723          |                             |                                | 69099          |          |                | 98374<br>98717 | 98431                   | 08881          | 98887          | 98944          |
| 57       |                    |                |                | 69595                       | 69718                          |                | 57       |                | 99057          | 00119                   | 00160          | 00225          | 99281          |
| 58       | 69963              |                |                | 70328                       |                                | 70569          |          | 00337          | 00303          | 99448                   | 99504          | 99#59          | 99615          |
| 59       | 70689              |                | 70028          |                             |                                | 71285          |          | 99670          | 99725          | 99780                   | 99835          | 99890          | 9945           |
|          |                    |                |                |                             |                                |                |          |                |                | <del></del>             |                |                |                |

|     | * -            |                |  | 1              | Argume         | nt. M          | IDI      | DLE TIM                                 | IF.            |                |  |                   |                |
|-----|----------------|----------------|--|----------------|----------------|----------------|----------|---|----------------|----------------|--|-------------------|----------------|
| 1   |                |                | 2 Ho   |                |                |                | 1        |   |                | з Но           |  |                   |                |
| M   | 0"             | 10"            | 20"  | 30"            | 40″            | 50"            | M.       | 0"                                      | 10"            | 20"            | 307  | 40"               | 50"            |
| 0   | 5.00000        | 00055          | 00109  | 00164          | 00218          | 00272          | 0        | 5.15052                                 | 15089          | 15115          | 15146  |                   |                |
| 1   | 00337          |                | 00435  | 00489          | 00543          | 00596          | 1        | 15240                                   |                | 15303          |  | 15365             |                |
| 2   | 00650          | 00704          | 00757  | 00810          | 00864          | 00917          | 2        |   | 15458          | 15:89          |  |                   | 1558           |
| 3   | 00970          |                | 01076  | 01129          | 01182          |                | 3        |   | 15649          |                | 15705  |                   | 1576           |
| 4   | 01287          | 01339          | 01392  | 01444          | 01496          | 01549          |          |   |                | 15857          | 15888  |                   | 1594           |
| 5   | 01601          | 01653          | 01705  | 01757          | 01808          | 01860          | 5        |   |                | 16039          |  |                   | 1612           |
| 6   | 01912          | 01963          |  | 02066          | 02117          | 02168          | 6        |   | 16189          | 16219          |  |                   | 1630           |
| 7   | 02219          | 02270          |  | 02372          | 02423          |                | 7        | 16338                                   | 16318          |                |  |                   | 1648           |
| 8   | 02524          | 02574          | 02625  | 02675          |                | 02776          | 8        | 16516                                   | 16545          |                |  | 16633             | 1666           |
| 9   | 02826          | 02876          | 02926  | 02976          | 03026          | 03075          | 9        | 16692                                   | 16721          | 16750          | 16779  | 16808             | 1683           |
| 10  | 5.03125        | 03174          | 03224  | 03273          | 03322          | 03372          |          | 5.16866                                 |                |                | 16953  | 16982             | 1701           |
| 11  | 03421          | 03470          | 03519  |                | 03617          | 03665          | 11       | 17039                                   |                | 17096          | 17125  |                   | 1718           |
| 12  | 03714          | 03763          | 03811  |                | 03908          | 03956          | 12       | 17210                                   |                | 17267          | 17296  | The second second | 1785           |
| 13  | 04004          | 04052          | 04100  |                | 04196          | 04244          | 13       |   | 17408          | 17437          | 17465  | 17493             | 1752           |
| 14  | 04292          | 04340          |  |                | 04482          |                | 14       | 7.0                                     | 17577          | 17604          | 17632  | 17660             | 1768           |
| 15  | 04577          | 04624          | 04671  |                | 04765          | 04812          | 15       | 17716                                   | 17743          |                | 17798  | 17826             | 1785           |
| 16  | 04859          |                | 04953  |                | 05046          | 05092          | 16       |   | 17908          |                | 17968  |                   | 18011          |
| 17  | 05139          |                | 05231  |                | 05324          |                | 17       | 18045                                   | 18072          |                | 18126<br>18288   | 18154             | 18181          |
| 18  | 05416          |                |  |                | 05599          |                | 18       | 18208<br>18369                          | 18235<br>18395 | 18261<br>18422 | The second second  | 18315<br>18475    | 18341<br>18501 |
| 19  | 05690          | 05736          | 05781  | 05827          | 05872          | 05917          | 19       |   | -              |                |  | -                 | -              |
| 20  | 5.05962        | 06007          | 06052  | 06097          | 06142          | 06187          |          | 5.18528                                 | 18555          |                | 18608  | 18634             | 18660          |
| 21  | 06232          | 06275          | 06321  | 06365          | 06410          |                | 21       | 18687                                   | 18713          |                |  | 18791             | 18818          |
| 22  | 06498          | 06543          | 06587  | 06631          |                |                | 22       | The state of the state of               | 18870          |                |  | 18948             | 1897           |
| 23  | 06763          | 06807          | 06851  |                | 06938          | 06981          | 23       |   | 19025          | 1 1 1 1 m 1    |  |                   | 1912           |
| 24  | 07025          |                |  |                | 07198          | 07241          | 24       | 19153                                   | 19179          |                | Page 100 - 1 | 19255             | 1928           |
| 25  | 07284          |                | 07371  |                | 07456          | 07499          | 25       | 100000000000000000000000000000000000000 | 19331          | 19857          |  | 19407             | 1943           |
| 26  | 07542          |                | 07627  |                | 07712          | 07754          | 26       |   |                | 19508<br>19657 | 19533  | 19558             | 1958:          |
| 27  | 07797          | 07839          | 07881  |                | 07965          | 08007          | 27<br>28 | 19608                                   | 19632<br>19781 | 19806          | 12300  | 19707<br>19855    | 19731          |
| 28  | 08049          |                | 08133  |                | 08216<br>08465 | 08258<br>08507 | 29       | 19904                                   | 19928          | 19952          | 19977  | 20001             | 2002.          |
| 29  | 08300          | 08341          |  | _              |                |                | -        |   |                |                |  |                   |                |
| 30  | 5.08548        |                | 08630  | 08671          |                | 08753          | 1000     | 5.20050                                 | 20074          | 20098          |  | 20146             | 20170          |
| 31  | 08794          |                | 08875  |                | 08956          | 08997          | 31       | 20194                                   | 20218          | 20242          | 20266  | 20290             | 20314          |
| 32  | 09037          |                |  | 09158          |                |                | 32       | 20338                                   | 20362          | 20385          |  | 20433<br>20574    | 20456          |
| 33  | 09279          |                |  |                |                |                | 33       | 20480<br>20621                          | 20404<br>20644 | 20527<br>20668 | 20551  | 20714             | 2059           |
| 34  | 09518          |                | 09597  | 09637          | 09676          | 09716          | 34       |   | 20783          | 20807          |  | 20853             | 2013           |
| 35  | 09755          |                |  |                | 09912<br>10146 | 09951<br>10184 | 36       | 20899                                   | 20922          | 20945          | 20967  | 20990             | 21015          |
| 36  | 09990          |                |  | 10107          | 10377          | 10416          | 37       | 21036                                   | 21059          | 21081          | 21104  | 21127             | 21149          |
| 37  | 10223          |                | 10300  | 10559          | 10607          | 10645          | 38       | 21172                                   | 21194          | 21217          | 21239  | 21261             | 21284          |
| 38  | 10454<br>10683 |                | 10759  |                | 10834          | 10872          | 39       | 21306                                   | 21329          | 21351          | 21375  | 21395             | 2141           |
| -   |                |                |  |                |                |                | 40       | 5 21439                                 | 91469          | 21484          | 21506  | 21528             | 21550          |
| 40  |                |                | 10985  | 11022<br>11246 | 11060<br>11283 | 11320          | 41       | 21572                                   |                | 21615          | 21637  | 21659             | 21681          |
| .41 | 11135          |                | 11209<br>11431   | 11468          |                | 11542          | 42       | 21702                                   | 21724          | 21746          | 21767  | 21789             | 21810          |
| 42  | 11357          | 11394          | The latest the second  | 11688          | 11725          | 11761          | 43       | 21832                                   |                | 21875          | 21896  | 21918             | 21939          |
| 43  | 11578<br>11797 |                | A CONTRACTOR OF THE PARTY OF TH |                |                | 11979          | 44       | 21960                                   |                | 22003          | 22024  | 22045             | 22067          |
| 44  | 12014          | 12050          | The second second  | 12122          |                | 12194          | 45       | 22088                                   | 22109          | 22130          | 22151  | 22172             | 22195          |
| 45  | 12229          | 12265          | 12301  | 12336          | 12372          |                | 46       | 22214                                   | 22235          | 22255          | 22276  | 22297             | 22318          |
| 47  | 12443          | Account to the | 12513  | 12549          | 12583          | 12619          | 47       | 22338                                   | 22359          | 22380          | 22400  | 22421             | 22445          |
| 48  | 12654          | and the second | 12724  | 12759          | 12794          | 12829          | 48       | 22462                                   | 22483          | 22503          | 22524  | 22544             | 22564          |
| 49  | 12864          |                | The second second  |                | 13002          | 13037          | 49       | 22585                                   | 22605          | 22625          | 22645  | 22666             | 22680          |
|     | 5.13071        | 13106          | 13140  | 13175          | 13209          | 18248          | 50       | 5.22706                                 | 22725          | 22746          | 22766  | 22786             | 22806          |
| 51  | 19977          | 13311          | 13345  | 13379          | 13413          | 13447          |          | 22826                                   | 22846          | 22866          | 22886  | 22906             | 2292           |
| 52  | 19481          | 18515          | 19540  | 13583          | 13616          | 13650          | 5:       | 22945                                   | 22965          | 22984          | 23004  | 23024             | 23049          |
| 53  | 13684          | 13717          | 13751  | 13784          | 13818          | 13851          | 59       | 23063                                   | 23082          | 23102          | 23121  | 23141             | 23160          |
| 54  | 13834          | 15917          | 13951  | 13984          | 14017          | 14050          | 54       | 23180                                   | 23199          | 23218          | 23238  | 23257             | 25276          |
| 55  | 14083          | 14116          | 14149  | 14182          | 14215          | 14247          | 55       | 23295                                   |                |                | 23352  |                   |                |
| 56  | 14280          | 14313          | 14345  | 14378          | 14411          | 14443          | 1.6      | 28410                                   |                |                | 23466  |                   |                |
| 57  | 14475          | 14508          | 14540  | 14573          | 14605          | 14637          | 57       | 23523                                   |                |                | 23579  |                   |                |
| 20  | 14660          | 14701          | 14799  | 14765          | 14707          | 14899          | 55       | 23635                                   | 23654          | 23672          | 23691  | 23709             | 2372           |
| 59  | 5,14861        | 14893          | 14925  | 14957          | 14988          | 15020          | 55       | 1.23746                                 | 23765          | 23783          | 23801  | 28820             | 2383           |
| -   |                | Land Same      | -  | -              |                |                |          |   |                |                |  |                   |                |

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TABLE XXXIV. NATURAL SINES.

|            | <del></del>    | ·              | N                       |                                | RAI                     |                         | NES.           |                         |                | 40             | 1        |
|------------|----------------|----------------|-------------------------|--------------------------------|-------------------------|-------------------------|----------------|-------------------------|----------------|----------------|----------|
| B#:        |                | yo<br>Di       |                         | 10                             |                         | 20                      |                | 30                      |                |                | -        |
| Min.       | N. sine.       | N. cos.        | N. sine.                | N. cos.                        | N. sine.                | N. cos.                 | N. sine.       | N. cos.                 | N. sine.       | N. cos.        |          |
| 0          | 50000          | 86603          | 51504                   | 85717                          | 52992                   | 84805                   | 54464          | 83867                   | 55919          | 82904          | .60      |
| 1          | 50025          | 86588          | 51529                   | 85702                          | 53017                   | 84789                   | 54488          | 83851                   | 55943          | 82887          | 59       |
| 2          | <b>5005</b> 0  | 86573          | 51554                   | 85687                          | 53041                   | 84774                   | 54513          | 83835                   | 55968          | 82871          | 58       |
| 3<br>4     | 50076<br>50101 | 86559<br>86544 | 51579                   | 85672                          | 53066<br>53091          | 84759<br>84743          | 54537<br>54561 | 83819                   | 55992<br>56016 | 82855<br>82839 | 56       |
| 5          | <b>\$018</b> 6 | 86530          | 51604<br>51628          | 85657<br>85642                 | 53115                   | 84728                   | 44586          | 83804<br>83788          | 56040          | 82822          | 55       |
| 6          | 50151          | 86515          | 516 <b>5</b> 3          | 85627                          | 53140                   | 84712                   | 54610          | 85772                   | 56064          | 82806          | 54       |
| 7          | 50176          | 86501          | 51678                   | 85612                          | 53164                   | 84697                   | 54635          | 83756                   | 56088          | 82790          |          |
| В          | 50201          | 86486          | 51703                   | 85597                          | 53189                   | 84681                   | 54659          | 83740                   | 56112          | 82773          |          |
| 9          | 50227          | 86471          | 51728                   | <b>855</b> 82                  | 53214                   | 84666                   | <i>5</i> 4683  | 83724                   | 56136          | 82757          | 51       |
| 10         | 50252          | 86457          | 51753                   | 85567                          | 53238                   | 84650                   | 547Ó8          | 83708                   | 56160          | 82741          | 50       |
| ji .       | 50277          | 86442          | 51778                   | 85551                          | 53263                   | 84635                   | 54782          | 83692                   | 56184          | 82724          | 49       |
| 12         | 50302          | 86427          | 51803                   | 85536                          | 53288                   | 84619                   | 54756          | 83676                   | 56208          | 82708          | 48       |
| 18         | 50327          | 86418          | 51828                   | 85521                          | 53312                   | 84604                   | 54781          | 83660                   | 56232          | 82692          |          |
| 14         | <b>5035</b> 2  | <b>8639</b> 8  | 51852                   | 85506                          | <i>5</i> 383 <b>7</b>   | 84588                   | 54805          | 83645                   | 56256          | 82675          |          |
| 15         | 50377          | 86384          | 51877                   | 85491                          | 53361                   | 84573                   | 54829          | 83629                   | 56280          | 82659          |          |
| 16         | 50408          | <b>8636</b> 9  | 51902                   | 85476                          | 53386                   | 84557                   | 54854          | 83613                   | 563 <b>05</b>  | 82643          | 1        |
| 17<br>18   | 50428          | 86354          | 51927                   | 85461                          | 53411                   | 84542                   | 54878          | 83597                   | 56329          | 82626<br>82610 |          |
| 19         | 50453<br>50478 | 86340<br>86325 | 51952<br>51977          | 85446<br>85431                 | 53435<br>53460          | 84526<br>84511          | 54902<br>54927 | 83581<br>83565          | 56353<br>56377 | 82593          | ١.,      |
| l          | 30176          | 00323          | 31911                   | 00401                          | 33400                   | 04311                   | <del></del>    | 63303                   | l              |                | .        |
| 20         | 50503          | 86810          | 52002                   | 85416                          | 53484                   | 84495                   | 54951          | 83549                   | 56401          | 82577          |          |
| 21         | <b>5</b> 0528  | 86295          | 52026                   | 85401                          | <i>5</i> 3 <i>5</i> 09  | 84480                   | 54975          | 83533                   | 56425          | 82561          |          |
| 92<br>28   | 50558          | 86281          | 52051                   | 85385                          | 53534                   | 84464                   | 54999<br>55024 | 83517                   | 56449<br>56473 | 82544<br>82528 | - سها    |
| 24         | 50578<br>50608 | 86266<br>86251 | 52076<br>52101          | 85370                          | 53558<br>53583          | 84448<br>84433          | 55048          | 83501<br>83485          | 56497          | 82511          | 1 00     |
| 25         | 50628          | 86237          | 52126                   | 85355<br>85340                 | 53607                   | 84417                   | 55072          | 83469                   | 56521          | 82495          |          |
| 26         | 50654          | 86222          | 52151                   | 85325                          | 53632                   | 84402                   | 55097          | <b>8345</b> 3           | 56545          | 82478          | 34       |
| 27         | 50679          | 86207          | 52175                   | 85310                          | 536 <b>5</b> 6          | 84386                   | 55121          | 83437                   | 56569          | 82462          | 33       |
| 28         | 50704          | 86192          | 52200                   | 85294                          | <i>5</i> 3681           | 84370                   | <i>5</i> 5145  | 83421                   | 56593          | 82446          |          |
| 29         | 50729          | 86178          | 52225                   | 85279                          | <b>5</b> 3705           | 84355                   | <i>55</i> 169  | 83405                   | 56617          | 82429          | 51       |
| 30         | 50754          | 86163          | 52250                   | 85264                          | 53730                   | 84339                   | 55194          | 83389                   | 56641          | 82413          | 30       |
| 81         | 50779          | 86148          | 52275                   | 85249                          | 53754                   | 84324                   | 55218          | 83373                   | 56665          | 82396          | 29       |
| 82         | 50804          | 86133          | 52299                   | 85234                          | 53779                   | 84308                   | 55242          | 83356                   | 56689          | 82380          | 28       |
| 83         | 50829          | 86119          | 52324                   | 85218                          | 53804                   | 84292                   | 55266          | 83340                   | 56713          | 82363          | 27       |
| 84         | 50854          | 86104          | 52349                   | 85203                          | 53828                   | 84277                   | 55291          | 85324                   | 56736          | 82347          | 26<br>25 |
| S5         | 50879          | 86089          | 52374                   | 85188                          | 53853                   | 84261                   | 55315          | 83308                   | 56760          | 82330<br>82314 | 1 04     |
| 86<br>87   | 50904<br>50929 | 86074<br>86059 | 52399<br>52 <b>42</b> 8 | 85173                          | 53877<br>53902          | 84245<br>84230          | 55339<br>55363 | 83292<br>83276          | 56784<br>56808 | 82297          | 23       |
| 88         | 50929          | 86045          | 52448                   | 85157<br>85142                 | 53926                   | 84214                   | 55388          | 83260                   | 56832          | 82281          | 22       |
| 89         | <i>8</i> 0979  | 86030          | 52473                   | 85127                          | 53951                   | 84198                   | 55412          | 83244                   | 56856          | 1              | 21       |
| 1          |                |                |                         |                                |                         |                         |                | <del></del>             |                |                | ٧0       |
| 40         | 51004          | 86015          | 52498                   | 85112                          | 53975.                  | 84182                   | 55436<br>55460 | 83228                   | 56880          | 82248<br>82231 | 19       |
| 41<br>42   | 51029          | 86000<br>85985 | 52522<br>52547          | 85096<br>85081                 | 540 <b>0</b> 0<br>54024 | 84167<br>841 <i>5</i> 1 | 55460<br>55484 | 83212<br>83195          | 56904<br>56928 | 82214          | 1        |
| 48         | 51054<br>51079 | 85970          | 52547<br>52572          | 85066                          | 54049                   | 84135                   | 55509          | 83179                   | 56952          | 82198          | 17       |
| 44         | 51104          | 85956          | 52597                   | 85051                          | 54073                   | 84120                   | 55533          | 83163                   | 56976          | 82181          | 16       |
| 45         | 51129          | 85941          | 52621                   | 85085                          | 54097                   | 84104                   | 55557          | 83147                   | 57000          | 82165          | 15       |
| 46         | 51154          | 85926          | 52646                   | 85020                          | 54122                   | 84088                   | <i>555</i> 81  | 83131                   | 57024          | 82148          | 14       |
| 47         | 51179          | 85911          | 52671                   | 85005                          | 54146                   | 84072                   | 55605          | 83115                   | 57047          | 82132          | 13       |
| 48         | 51204          | 85896          | 52696                   | 84989                          | 54171                   | 84057                   | 55630          | 83098                   | 57071          | 82115          | 111      |
| 49         | 51229          | 85881          | 52720                   | 84974                          | 54195                   | 84041                   | 55654          | 83082                   | 57095          | 82098          | ــــا.   |
| 50         | 51254          | 85866          | 527.45                  | 84959                          | 54220                   | 84025                   | 55678          | 83066                   | 57119          | 82082          | 10       |
| 51         | 51279          | 85851          | 52770                   | 84948                          | 54244                   | 84009                   | 55702          | 83050                   | <b>5714</b> 3  | 82065          | 9        |
| <b>5</b> 2 | 51904          | <b>858</b> 36  | 5279 <del>4</del>       | 84928                          | 54269                   | 83994                   | 55726          | 83034                   | 57167          | 82048          | 7        |
| <i>5</i> 3 | 51329          | 85821          | .52819                  | 84913                          | 54293                   | 83978                   | <i>5575</i> 0  | 83017                   | 57191          | 82032          | 6        |
| 54         | 51354          | 85806          | 52844                   | 84897                          | 54917                   | 83962                   | 55775          | 83001                   | 57215          | 82015<br>81999 | 5        |
| 55         | 51379          | 85792          | 52869                   | 84882<br>94966                 | 54342                   | 83946                   | 55799          | 82985                   | 57238<br>57262 | 81982          | 4        |
| 56<br>57   | 51404<br>51429 | 85777<br>85762 | 52893<br>52918          | <b>8496</b> 6<br><b>8485</b> 1 | 54366<br>54391          | 8393Q<br>8391 <i>5</i>  | 55823<br>55847 | 82969<br>829 <b>5</b> 3 | 57286          | 81965          | 8        |
| 58         | 51454          | 85747          | 52943                   | 84836                          | 54415                   | 83899                   | 55871          | 82986                   | 57310          | 81949          | 2        |
| 59         | 51479          | 85732          | 52967                   | 84820                          | 51110                   | 83883                   | <i>55</i> 895  | 82920                   | 57994          | 81932          | 1        |
| 60         | 51504          | 85717          |                         | 84805                          |                         | 85867                   | <i>55</i> 919  | 82904                   | 57358          | 81915          | 0        |
|            |                |                |                         |                                |                         | N. sine.                |                | N cinc                  | N. cos.        | N. sine.       | Min.     |
|            | N. cos.        |                | N. cos.                 | N. sine.                       |                         |                         |                |                         | N. cos.        | 0              |          |
| ·          | 59             | ,,,            | - 58                    | ,                              | 57                      | 70                      | 50             | 60                      | 00             | ,              |          |

TABLE XXXIV. NATURAL SINES,

|            | ) 3.           | 5°   | 3                       | 60             | 3              | 70             | 3              | 80             | . 39           | 90 1           |          |
|------------|----------------|--|-------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|
| Min.       |                | N. cos.  |                         | N. cos.        | N. sine.       | N. cos.        |                | N. cos.        | N. sine.       | N. cos.        |          |
|            |                |  |                         |                | <del></del>    | <u> </u>       |                | 78801          |                | 77715          | `60      |
| 0          | 57358<br>57381 | 8191 <i>5</i><br>81899   | 58779<br>58 <b>8</b> 02 | 80902<br>80885 | 60182<br>60205 | 79864<br>79846 | 61566<br>61589 | 78783          | 62932<br>62955 | 77696          | 59       |
| 2          | 57405          | 81882  | 58826                   | 80867          | 60228          | 79829          | 61612          | 78765          | 62977          | 77678          | 58       |
| 3          | 57429          | 81865  | 588 <b>4</b> 9          | 80850          | 60251          | 79811          | 61635          | 78747          | 63000          | 77660          | 57       |
| 4          | 57453          | 81848  | 58873                   | 80833          | 60274          | 79793          | 61658          | 78729          | 63022          | 77641          | 56       |
| 5          | 57477          | 81832  | 58896                   | 80816          | 60298          | 79776          | 61681          | 78711          | 68045          | 77623          | 55       |
| 6          | 57501          | 81815  | 58920                   | 80799          | 60321          | 79758          | 61704          | 78694          | 63068          | 77605          | 54       |
| 7          | 57524          | 81798  | 58943                   | 80782          | 60344          | 79741          | 61726          | 78676          | 68090          | 77586          | . 53     |
| 8          | 57548          | 81782  | 58967                   | 80765          | 60367          | 79723          | 61749          | 78658          | 68113          | 77568          | .52      |
| 9          | 57572          | 81765  | <b>5</b> 89 <b>9</b> 0  | 80748          | 60390          | 79706          | 61772          | 78640          | 63135          | 77550          | .51      |
| 10         | 57596          | 81748  | 59014                   | 80730          | 60414          | 79688          | 61795          | 78622          | 63158          | 77531          | 50       |
| 11         | 57619          | 81731  | 59,37                   | 80713          | 60437          | 79671          | 61818          | 78604          | 63180          | 77513          | 49       |
| 12         | 57643          | 81714  | 59061                   | 80696          | 60460          | 79653          | 61841          | 78586          | 63203          | 77494          | 48       |
| 13         | 57667          | 81698  | 59084                   | 80679          | 60483          | 79635          | 61864          | 78568          | 63225          | 77476          | 47       |
| 14         | 57691          | 81681  | 59108.                  | 80662          | 60506          | 79618          | 61887          | 78550          | 63248          | 77458          | 46       |
| 15         | 57715          | 81664  | 59131`                  | 80644          | 60529          | 79600          | 61909          | 78532          | 63271          | 77439          | 45       |
| 16         | 57738          | 81647  | 59154                   | 80627          | 60553          | <b>795</b> 83  | 61932          | 78514          | 63293          | 77421          | 44       |
| 17         | 57762          | 81631  | 59178                   | 80610          | 60576          | 79565          | 61955          | 78496          | 63316<br>63338 | 77402<br>77384 | 43<br>42 |
| 18         | 57786          | 81614  | 59201                   | 80593          | 60599          | 79547          | 61978          | 78478          | 63361          | 77366          | 41       |
| 19         | 57810          | 81597  | 59225                   | . 80576        | 60622          | 79530          | 62001          | 78460          | <b></b>        |                |          |
| 20         | 57833          | 81580  | 59248                   | 80558          | 60645          | 79512          | 62024          | 78442          | 63383          | 77347          | 40       |
| 21         | 57857          | 81563  | 59272                   | 80541          | 60668          | 76494          | 62046          | 78424          | 63406          | 77329          | 39       |
| 22         | 57881          | 81546  | <b>592</b> 95           | 80524          | <b>60</b> 691  | 79477          | 62069          | 78405          | 63428          | 77310          | 38       |
| 23         | 57904          | 81530  | 59318                   | 80507          | 60714          | 79459          | 62092          | 78387          | 63451          | 77292          | 37       |
| 24         | 57928          | 81513  | 59342                   | 80489          |                | 79441          | 62115          | 78369          | 63473<br>63496 | 77273<br>77255 | 36<br>35 |
| 25         | 57952          | 81496  | 59365                   | 80472          | 60761          | 79424          | 62138<br>62160 | 78851<br>78333 | 63518          | 77236          | 34       |
| 26<br>27   | 57976<br>57999 | 81479  | 59389<br>59412          | 80455<br>80438 | 60784          | 79406<br>79388 | 62183          | 78315          | 63540          | 77218          | 33       |
| 28         | 58023          | 81462<br>81445   | 59436                   | 80420          | 60807<br>60830 | 79371          | 62206          | 78297          | 68563          | 77199          | 32       |
| 29         | 58047          | 81428  | 59459                   | 80403          | 60853          | 79353          | 62229          | 78279          | 63585          | 77181          | 31       |
| J          |                |  | ļ                       |                | <b></b>        |                |                | ļ              | CUCOR          |                |          |
| 30         | 58070          | 81412  | 59482                   | 80386          | <b>6</b> 0876  | 79335          | 62251          | 78261          | 63630<br>63630 | 77162          | 30<br>29 |
| 31         | 58094          | 81395  | 59506                   | 80368          | 60899          | 79318          | 62274          | 78243          | 63653          | 77144          | 28       |
| 32         | 58118          | 81378  | 59529                   | 80351          | 60922          | 79300          | 62297<br>62520 | 78225<br>78206 | 63675          | 77107          | 27       |
| 33<br>34   | 58141<br>58165 | 81361<br>81344   | 59552<br>59576          | 80334<br>80316 | 60945<br>60968 | 79282          | 62342          | 78188          | 63698          | 77088          | 26       |
| 35         | 58189          | 81327  | 59599                   | 80299          | 60991          | 79247          | 62865          | 78170          | 63720          | 77070          | 25       |
| 36         | 58212          | 81310  | 59622                   | 80282          | 61015          | 79229          | 62388          | 78152          | 63742          | 77051          | 24       |
| 37         | 58236          | .81293   | 59646                   | 80264          | 61038          | 79211          | 62411          | 78134          | 63765          | 77033          | 29       |
| 38         | 58260          | 81276  | 59669                   | 80247          | 61061          | 79193          | 62483          | 78116          | 63787          | 77014          | 22       |
| 39         | 58283          | 81259  | 59693                   | 80230          | 61084          | 79176          | 62456          | 78098          | 63810          | 76996          | 21       |
| 40         | 58307          | 81242  | 59716                   | 80212          | 61107          | 79158          | 62479          | 78079          | 63832          | 76977          | 20       |
| 41         | 58330          | 81225  | 59739                   | 80195          | 61130          | 79140          | 62502          | 78061          | 63854          | 76959          | 19       |
| 42         | 58354          | 81208  | 59763                   | 80178          | 61153          | 79122          | 62524          | 78043          | 63877          | 76940          | 18       |
| 43         | 58378          | 81191  | 59786                   | 80160          | 61176          | 79105          | 62547          | 78025          | 63899          | 76921          | 17       |
| 44         | 58401          | 81174  | 59809                   | 80143          | 61199          | 79087          | 62570          | 78007          | 63922          | 76903          | 16       |
| 45         | 58425          | 81157  | 59832                   | 80125          | 61222          | 79069          | 62592          | 77988          | 63944          | 76884          | 15       |
| 46         | 58449          | 81140  | 59856                   | 80108          | 61245          | 79051          | 62615          | 77970          | 68966          | 76866          | 14       |
| 47         | 58472          | 81123  | 59879                   | 80091          | 61268          | 79033          | 62638          | 77952          | 68989<br>64011 | 76847<br>76828 | 13<br>12 |
| 48         | 58496          | 81106  | 59902<br>50096          | 80073          | 61291          | 79016          | 62660          | 77984          | 64083          | 76810          | 11       |
| 49         | 58519          | 81089  | 59926                   | 80056          | 61314          | 78998          | 62683          |                | <del> </del>   |                |          |
| <i>5</i> 0 | 58543          | 81072  | 59949                   | 80038          | 61337          | 78980          | 62706          | 77897          | 64056          | 76791          | 10       |
| 51         | 58567          | 81055  | 59972.                  |                | 61360          | 78962          | 62728          | 77879          | 64078          | 76772          | 9        |
| 52         | 58590          | 81038  |                         | 80003          | 61383          | 78944          |                | 77861          | 64100          | 76754          | 8        |
| 53         | 58614          | 81021  | 60019                   | 79986          | 61406          | 78926          | 62774          | 77843          | 64123          | 76735          | 7        |
| 54<br>55   | 58637          | 81004  | 60042                   | 79968          | 61429          | 78908          | 62796          | 77824          | 64145<br>64167 | 76717<br>76698 | 6        |
| 55<br>56   | 58661<br>58684 | 80987  | 6006 <i>5</i><br>60089  | 79951<br>79934 | 61451          | 78891<br>78873 | 62819<br>62842 | 7780G<br>77788 | 64190          | 76679          | 5<br>4   |
| 57         | 58708          | 80970°<br>80953  | 60112                   | 79916          | 61474<br>61497 | 78855          | 62864          | 77769          | 64212          | 76661          | 3        |
| <i>5</i> 8 | 58731          | 80936  | 60135                   | 79899          | 61520          | 78837          | 62887          | 77751          | 64294          | 76642          | 2        |
| 59         | 58755          | 80919  | 60158                   | 79881          | 61543          | 78419          | 62909          | 77788          | 64256          | 76623          | ĩ        |
| 60         | 58779          | 80902  | 60182                   | 79864          | 61566          | 78801          | 62952          | 77715          | 64279          | 76604          | ō        |
|            |                |  |                         | <del></del>    |                |                |                |                |                | N. sine        | Min      |
| 1          |                | N. sine.   |                         | N. sine.       |                |                | N. cos.        |                |                | N. Sine.       | INTIE    |
|            |                |  | 5:                      | ) ·            | 5              | 50             | 5              | 10             |                | ) -            | ,        |
| A          | AT MAKE THE    | Contract of the Contract of th | D. 1879 - 1770          |                |                |                | ·              |                |                |                |          |

## NATURAL SINES.

| Min.       |                  | )° ]                    |                | 10                      |                | 20             |                         | 30                      | 1 4                     | 4º             |           |
|------------|------------------|-------------------------|----------------|-------------------------|----------------|----------------|-------------------------|-------------------------|-------------------------|----------------|-----------|
|            | N. sine.         | N. cos.                 |                | N. cos.                 |                | N. cos.        |                         | N. cos.                 |                         |                | 1         |
| - 0        | 64279            | 76604                   | 65606          | 75471                   | 66913          | 74314          | 68200                   | 73135                   | 69466                   | 71934          | 60        |
| ĭ          | 64301            | 76586                   | 65628          | 75452                   | 66935          | 74295          | 68221                   | 73116                   | 69487                   | 71914          | 59        |
| 2          | 64328            | 76567                   | 65650          | 75433                   | 66956          | 74276          | 68242                   | 73096                   | 69508                   | 71894          | 58        |
| 3          | 64346            | 76548                   | 65672<br>65694 | 75414                   | 66978          | 74256          | 68264                   | 73076                   | 69529                   | 71873          | 57        |
| 5          | 64368<br>64390   | 76530<br>76511          | 65716          | 75395<br>75375          | 66999<br>67021 | 74237<br>74217 | 68285<br>68376          | 73056<br>730 <b>3</b> 6 | 69549<br>69570          | 71853<br>71893 | 56<br>55  |
| 6          | 64112            | 76492                   | 65738          | 75356                   | 67043          | 74198          | 68327                   | 73016                   | 69591                   | 71813          | 54        |
| 7          | 64435            | 76473                   | 65759          | 75337                   | 67064          | 74178          | 68349                   | 72996                   | 69612                   | 71792          | 53        |
| 8          | 64457            | 76455                   | 65781          | 75318                   | 67086          | 74159          | 68370                   | 72976                   | 69633                   | 71772          | 52        |
| 9          | 64479            | 76436                   | 65803          | 75299                   | 67107          | 74139          | 68391                   | 72957                   | 69654                   | 71752          | 51        |
| 10         | 64501            | 76417                   | 65825          | 75280                   | 67129          | 74120          | 68412                   | 72937                   | 69675                   | 71732          | 50.       |
| 11<br>12   | 64524<br>64546   | 76398<br>76380          | 65847<br>65869 | 75261<br>75241          | 67151<br>67172 | 74100<br>74080 | 68434<br>68455          | 72917<br>72897          | 69696                   | 71711          | 49        |
| 13         | 64568            | 76361                   | 65891          | 75222                   | 67194          | 74061          | 68476                   | 72877                   | 69717<br>6 <b>97</b> 37 | 71691<br>71671 | 48        |
| 14         | 64590            | 76342                   | 65913          | 75203                   | 67215          | 74041          | 68497                   | 72857                   | 69758                   | 71650          | 46        |
| 15         | 64612            | 76323                   | <b>65</b> 935  | 75184                   | 67237          | 74022          | 68518                   | 72837                   | 69779                   | 71630          | 45        |
| 16         | 64635            | 76304                   | 65956          | 75165                   | 67258          | 74002          | 68539                   | 72817                   | 69800                   | 71610          | 44        |
| 17<br>18   | 64657<br>64679   | 76286<br>76267          | 65978<br>66000 | 75146<br>75126          | 67280<br>67301 | 73983<br>73963 | 68561<br>68582          | 72797<br>72777          | 69821                   | 71590          | 43<br>42  |
| 19         | 64701            | 76248                   | 66022          | 75107                   | 67323          | 73944          | 68608                   | 72757                   | 69842<br>69862          | 71569<br>71549 | 41        |
|            |                  |                         | 66044          |                         |                |                |                         |                         |                         |                |           |
| 20<br>21   | 64723<br>64746   | 76229<br>76210          | 66066          | 75088<br>75069          | 67344<br>67366 | 73924<br>73904 | 68624<br>68 <b>G</b> 45 | 7 <b>2</b> 737<br>72717 | 69883<br>69904          | 71529<br>71508 | 40.<br>39 |
| 22         | 64768            | 76192                   | 66088          | 75050                   | 67387          | 73885          | 68666                   | 72697                   | 69925                   | 71488          | 38        |
| 23         | 64790            | 76173                   | 66109          | 75030                   | 67409          | 73865.         | 68688                   | 72677                   | 69946                   | 71468          | 37.       |
| 24         | 64812            | 76154                   | 66131          | 75011                   | 67430          | 73846          | 68709                   | 72657                   | 69966                   | 71447          | 36        |
| 25<br>26   | 64834<br>64856   | 76135<br>76116          | 66153<br>66175 | 74992<br>74973          | 67452<br>67473 | 73826<br>73806 | 68730<br>68751          | 72637<br>72617          | 69987                   | 71427          | . 35      |
| 27         | 64878            | 76097                   | 66197          | 74953                   | 67495          | 73787          | 68772                   | 72597                   | 70008<br>70029          | 71407<br>71386 | 34<br>33  |
| 28         | 64901            | 76078                   | 66218          | 74934                   | 67316          | 73767          | 68793                   | 72577                   | 70049                   | 71366          | 32        |
| 29         | 64923            | 76059                   | 66240          | 74915                   | 67538          | 73747          | 68814                   | 72557                   | 70070                   | 71345          | 31        |
| 30         | 64945            | 76041                   | 66262          | 74896                   | 67559          | 737 <b>2</b> 8 | 68893                   | 72537                   | 70091                   | 71325          | 30        |
| 31         | 64967            | 76022                   | 66284          | 74876                   | 67580          | 73708          | <b>6</b> 8857           | 72517                   | 70112                   | 71305          | 29        |
| 32         | 64989            | 76003                   | 66306          | 74857                   | 67602          | 73688          | 68878                   | 72497                   | 70132                   | 71284          | 28        |
| 33<br>34   | 65011<br>65033   | 75984<br>7596 <b>5</b>  | 66327<br>66349 | 74838<br>74818          | 67623<br>67645 | 73669<br>73649 | 68899<br>68920          | 72477<br>72457          | 70153<br>70174          | 71264          | 27<br>26  |
| 35         | 65055            | 75946                   | 66371          | 74799                   | 67666          | 78629          | 68941                   | 72437                   | 70174                   | 71243<br>71223 | 25        |
| 36         | 65077            | 75927                   | 66393          | 74780                   | 67688          | 73610          | 68962                   | 72417                   | 70215                   | 71203          | 24        |
| 37         | 65100            | 75908                   | 66414          | 74760                   | 67709          | 73590          | <b>6</b> 8983           | 72397                   | 70286                   | 71182          | 23        |
| 38<br>39   | 65122  <br>65144 | 75889                   | 66436<br>66458 | 74741                   | 67730<br>67752 | 73570          | 69004                   | 72577                   | 70257                   | 71162          | 22        |
|            |                  | 75870                   |                | 74722                   |                | 73551          | 69025                   | 72357                   | 70277                   | 71141          | 21        |
| 40<br>41   | 65166            | 75851                   | 66480          | 74703                   | 67773          | 73531          | 69046                   | 72337                   | 70298                   | 71121          | 20        |
| 42         | 65188<br>65210   | 758 <b>3</b> 2<br>75813 | 66501<br>66523 | 74683<br>7 <b>46</b> 64 | 67795<br>67816 | 73511<br>73491 | 69067<br>69088          | 72317<br>7229 <b>7</b>  | 70319<br>70339          | 71100          | 19<br>18  |
| 43         | 65232            | 75794                   | 66545          | 74644                   | 67837          | 73472          | 69109                   | 72297                   | 70360                   | 71080<br>71059 | 17        |
| 44         | 65254            | 75775                   | 66566          | 74625                   | 67859          | 73452          | 69130                   | 72257                   | 70381                   | 71039          | 16        |
| 45         | 65276            | 75756                   | 66588          | 74606                   | 27880          | 73432          | 69151                   | 72236                   | 70101                   | 71019          | 15        |
| 46<br>47   | 65298<br>65320   | 75738<br>75719          | 66610<br>66632 | 74586<br>74567          | 67901<br>67923 | 73413          | 69172<br>69193          | 72216<br>72196          | 70422                   | 70998          | 14        |
| 48         | 65342            | 75700                   | 66653          | 74548                   | 67944          | 73393<br>73373 | 69214                   | 72196                   | 70443<br>70463          | 70978<br>70957 | 13<br>12  |
| 49         | 65364            | 75680                   | 66675          | 74528                   | 67965          | 73353          | 69235                   | 72156                   | 70484                   | 70937          | ii        |
| 50         | 65386            | 75661                   | 66697          | 74509                   | 67987          | 79933          | 69256                   | 72136                   | 70505                   | 70916          | 10        |
| 51         | 65408            | 75642                   | 66718          | 74489                   | 68008          | 73314          | 69277                   | 72136                   | 70303                   | 70896          | 9         |
| 52         | 65490            | 75623                   | 66740          | 74470                   | 68029          | 73294          | 69298                   | 72095                   | 70546                   | 70875          | 8         |
| 53         | 65452            | 75604                   | 66762          | 74451                   | 68051          | 73274          | 69319                   | 72075                   | 70567                   | 70855          | 7         |
| 54<br>55   | 65474<br>65496   | 75585<br>75566          | 66783<br>66805 | 74431<br>74412          | 68072<br>68093 | 73254<br>73234 | 69340<br>69361          | 72055                   | 70587                   | 70834          | 5         |
| 56         | 65518            | 75547                   | 66827          | 74392                   | 68115          | 73234          | 69382                   | 72035<br>7201 <i>5</i>  | 70608<br>70628          | 70813<br>70793 | 4         |
| 57         | 65540            | 75528                   | 66848          | 74373                   | 68136          | 73195          | 69403                   | 71995                   | 70649                   | 70772          | 3         |
| 58         | 65562            | 75509                   | 66870          | 74353                   | 68157          | 73175          | 99424                   | 71974                   | 70670                   | 70752          | 2         |
| -59<br>-60 | 65584            | 75490                   | 66891          | 74834                   | 68179          | 73155          | 69445                   | 71954                   | 70690                   | 70731          | 0         |
|            | 65606            | 75471                   | 66913          | 74314                   | 68200          | 73135          | 69466                   | 71934                   | 70711                   | 70711          |           |
| · [        | N. cos.          | N. sine.                | N. cos.        | N. sinc.                | N. cos.        | N. sine.       | <b></b>                 | N. sine.                |                         |                | Min.      |
|            | . 49             | 90                      | 48             | 30 .                    | 4              | 70             | 4                       | 5 <b>0</b>              | 4.                      | 50             | احسب      |

## TABLE XXXV. 167 TO FIND THE LATITUDE BY DOUBLE ALTITUDES, AND THE ELAPSED TIME.

|                            |                  |                |                         | Argui          | nent.                           | HALF                             | EL         | APSED          | TIME.                           |                |                         |                |                                |
|----------------------------|------------------|----------------|-------------------------|----------------|---------------------------------|----------------------------------|------------|----------------|---------------------------------|----------------|-------------------------|----------------|--------------------------------|
|                            |                  |                | 0 H                     |                |                                 |                                  |            |                |                                 | 1 Ho           |                         |                |                                |
| М                          | 0"               | 10"            | 20"                     | 30"            | 40"                             | 50"                              | M.         | 0"             | 10"                             | 20             | 30"                     | 40"            | 50"                            |
| 0                          |                  | 13833          | 83730                   |                | 53627                           | <b>439</b> 36                    |            | 0.58700        | 58582                           | 58465          | <b>58</b> 348           | 58231          | 58115                          |
| 1                          | 2.36018          | 29324          | 23525                   | 18409          | 13839                           |                                  | 1          |                |                                 | 57768          | 57653                   | 57538          | 57424                          |
| 2                          | 05916<br>1.88307 | 02440          |                         | 96225<br>81613 | 93422<br>79593                  |                                  | 3          | 57310<br>56633 |                                 | 57083<br>56409 | 56970<br>56298          |                | 56745<br>56076                 |
| 4                          | 75814            |                | 72339                   |                |                                 | 67597                            | 4          |                |                                 | 55746          | 55637                   | 55528          | 55419                          |
| 5                          | 66125            | 64701          | 65322                   |                | 60690                           |                                  | 5          | 55811          | 55203                           | 55095          | 54987                   | 54880          | 54773                          |
| 6                          | 58208            | ł              |                         |                |                                 |                                  | 6          |                |                                 | 54453          | 54347                   | 54241          | 54136                          |
| 8                          | 51515<br>45718   |                | 49496<br>439 <b>4</b> 6 |                | 47566<br>42243                  |                                  | 8          |                | 53926<br>53303                  | 53822<br>53200 | 53718<br>53 <b>0</b> 97 | 53614<br>52995 | 53510<br>52893                 |
| 9                          | 40605            |                | 39027                   | 38258          | 37 <i>5</i> 03                  | 41417<br>36761                   | 9          |                | 52690                           | 52589          |                         | 52387          | 52286                          |
| 10                         |                  | 85315          | 34609                   |                | 33231                           | 32558                            | 1          | 0.52186        |                                 | 51986          | 51886                   | 51787          | 51688                          |
| 11<br>12                   | 31896<br>28120   | 31243<br>27522 | 30600<br>26931          |                | 29842<br>25774                  |                                  | 11<br>  12 |                |                                 | 51392<br>50808 | 51294<br>50711          | 51196<br>50615 | 51099<br>50519                 |
| 13                         | 24647            |                | 28549                   |                |                                 | 21952                            | 13         |                |                                 | 50232          | 50137                   |                | 49947                          |
| 14                         | 21432            |                | 20412                   | 19910          | 19415                           | 18925                            | 14         |                |                                 | 49664          | 49570                   | 49476          | 49388                          |
| 15                         | 18440            |                | 17487                   | 17018          |                                 | 16096                            | 15         |                | 49197                           | 49104          | 49012                   | 48920          | 48828                          |
| 16<br>17                   | 15642            | 15192<br>12590 | 14748<br>12171          | 14307<br>11757 | 13872<br>11346                  |                                  | 16<br>17   |                |                                 | 48553<br>48009 | 48462<br>47919          | 48371<br>47829 | 48280<br>47789                 |
| 18                         |                  | 10136          | 09740                   | 09348          |                                 | 08575                            | 18         |                |                                 | 47472          | 47383                   | 47295          | 47207                          |
| 19                         |                  | 07814          | 07439                   | 07067          | 06698                           | 06333                            | 19         |                | 47031                           | 46943          | 46856                   | 46769          | 46682                          |
|                            | 1.05970          | 05610          |                         | 04901          | 04550                           |                                  |            | 0.46595        |                                 | 46421          | 46335                   | 46249          | 46163                          |
| 21                         | 03857            | 03515          |                         |                | 02504                           |                                  | 21         | 46077          | 45992                           | 45907          | 45822                   | 45737          | 45652                          |
| 22<br>23                   | 01849<br>0.99918 | 01516<br>99606 | 01192<br>99296          |                | 98682                           | 00233<br>98378                   | 22<br>23   | 45567<br>45064 | 45483<br>44981                  | 45399<br>44898 | 45315<br>44815          | 45231<br>44732 | 45147<br>44649                 |
| 24                         | 98077            | 97777          | 97480                   | , ,            | 96891                           |                                  | 24         | 44567          | 44485                           | 44403          | 44321                   | 44239          | 44158                          |
| 25                         | 96310            | 96023          | 95738                   |                | 95172                           |                                  | 25         | 44077          | 43996                           | 43915          | 43834                   | 43753          | 43673                          |
| 26                         |                  | 94338          | 94063                   |                | 93519                           |                                  | 26         | 43593          | 43513                           | 43433          | 43353                   | 43273          | 43193                          |
| 27<br>28                   |                  | 92716          | 92452                   |                | 91928<br>90394                  |                                  | 27<br>28   | 43114          | 48035                           | 42956<br>42487 | 42877<br>42409          | 42799          | 42721                          |
| 29                         |                  |                | 90899<br>8 <b>94</b> 01 | 90646<br>89156 | 88913                           | 90149<br>88671                   | 29         | 42643<br>42176 | 42565<br>42099                  | 42022          | 41945                   | 42331<br>41868 | 42253<br>41792                 |
| 30                         | 0.88430          | 88191          | 87953                   | 87717          | 87481                           | 87247                            | 30         | 0.41716        | 41640                           | 41564          | 41488                   | 41412          | 41336                          |
| 31                         | 87015            | 86783          | 86553                   | 86324          | 86096                           |                                  | 31         | 41261          | 41186                           | 41111          | 41036                   | 40961          | 40886                          |
| 32<br>33                   | 85644<br>84317   |                | 85197<br>83884          | 84976<br>83669 | 847 <i>55</i><br>83 <b>4</b> 55 | 84535<br>83242                   | 32<br>33   | 40812<br>40368 | 40738<br>40295                  | 40664<br>40222 | 40590<br>40149          | 40516<br>40076 | 40442                          |
| 34                         | 83030            | 84100<br>82819 | 82609                   |                | 82193                           | 81986                            | 34         | 39930          | 39857                           | 39785          | 39713                   | 39641          | 39569                          |
| 35                         | 81780            |                | 81372                   | 81169          | 80967                           | 80767                            | 35         | 39497          | 39425                           | 39353          | 39282                   | 39211          | 39140                          |
| 36                         |                  | 80368          | 80170                   |                | 79777                           | 79581                            | 36         | 39069          | 38998                           | 38927          | 38856                   | 38786          | 38716                          |
| 37<br>38                   | 79387            | 79193          | 79001                   | 78809          | 78618                           | 78428                            | 37         | 38646          | 38576                           | 385Q6          | 38436                   | <b>38</b> 366  | 38296                          |
| 39                         | 78239<br>77122   | 78051<br>76938 | 77863<br>76756          | 77677<br>76574 | 77491<br>76393                  | 77306<br>76212                   | 38<br>39   | 38227<br>97813 | 381 <i>5</i> 8<br>3774 <i>5</i> | 38089<br>37677 | 380 <u>2</u> 0<br>37609 | 37951<br>57541 | 37 <b>882</b><br>37 <b>473</b> |
|                            | 0.76033          | 75854          | 75676                   | 75499          | 75323                           | 75147                            |            | 0.37405        | 37337                           | 37269          | 37202                   | 37135          | 37068                          |
| 41<br>42                   | 74972<br>73937   | 74797<br>73767 | 74624<br>78 <b>5</b> 97 | 74451<br>73429 | 74279<br>73261                  | 74107<br>73093                   | 41<br>42   | 37001<br>36602 | 36934<br>36586                  | 36867<br>36470 | 36800<br>36404          | 36734<br>36338 | 36668<br>36272                 |
| 43                         | 72926            | 72760          | 72595                   |                | 72266                           | 72103                            | 43         | 36206          | 36141                           | 3607G          | 36011                   | 35946          | 35881                          |
| 44                         | 71940            | 71778          | 71616                   | 71455          | 71295                           | 71135                            | 44         | <i>35</i> 816  | 85751                           | 35686          | 35622                   | 35558          | 35494                          |
| 45                         | 70976            | 70818          | 70660                   |                | 70346                           | 70190                            | 45         | 35430          | 35366                           | 35302          | 35258                   | 35174          | 35110                          |
| 46                         | 70034<br>69118   | 69879          | 69725                   | 69571          | 69418                           | 69265                            | 46         | 35047          | 34984                           | 34921          | 34858                   | 34795          | 34732                          |
| 47<br>48                   | 68212            | 68962<br>68064 | 68811<br>67916          | 68660<br>67769 | 68510<br>67622                  | 68 <b>3</b> 61<br>67 <b>4</b> 76 | 47<br>48   | 34669<br>34296 | 34606<br>342 <b>3</b> 4         | 34544<br>34172 | 34482<br>34110          | 34420<br>34048 | 343 <b>58</b><br>3 <b>5986</b> |
| 49                         | 67380            | 67185          | 67040                   | 66896          | 66752                           | 66609                            | 49         | 33925          | 33864                           | 33803          | 33742                   | 33681          |                                |
| 50                         | 0.66466          | 66324          |                         |                |                                 | 65760                            |            | 0.83559        | 33498                           | 33438          | 33378                   | 33318          | 33258                          |
| 51                         |                  | 65481          |                         | 65204          |                                 |                                  |            |                |                                 |                | 33017                   |                |                                |
| 52                         |                  | 64655          |                         |                |                                 | 64113                            |            |                |                                 |                | 32661<br>32309          |                |                                |
| 53<br>54<br>55<br>56<br>57 |                  | 63844<br>63050 |                         |                |                                 | 63313<br>62 <b>5</b> 29          |            |                |                                 |                | 31960                   |                |                                |
| 55                         |                  | 62271          |                         | 62014          |                                 | 61759                            |            |                | 31729                           |                |                         |                |                                |
| 56                         | 61632            | 61506          | 61980                   | 61254          | 61129                           | 61004                            | <b>5</b> 6 | 31443          | 31386                           | 31329          | 31272                   | 31216          | 311 <i>5</i> 9                 |
| 57                         |                  | 60755          |                         |                |                                 |                                  |            |                | 31046                           |                |                         |                |                                |
| 58<br>59                   | 50414            | 60018<br>59294 | 59896                   | 59775<br>59056 | 59654                           | 59534                            | 50         | 90766          |                                 | 30655<br>90393 | 30599                   | 90544          |                                |
| 59                         | 2237.4           | 19294          | 35119                   | 220301         | 2033/                           | 20016                            | 1 39       | 30133          | 30370                           | 30323          | 30200                   | .00213         | 3013                           |

|     |                |                |                | Argu    | ment.          | HALF  | EL  | APSED          | TIME              |       |                |                | -     |
|-----|----------------|----------------|----------------|---------|----------------|-------|-----|----------------|-------------------|-------|----------------|----------------|-------|
|     |                |                | 4 Ho           |         |                |       |     |                |                   | 5 H   |                |                |       |
| M.  | 0"             | 10"            | 20"            | 30"     | 40"            | 50"   | M.  | 0"             | 10"               | 20"   | 30"            | 40"            | 50"   |
| 0   | 0.06247        | 06229          | 06211          | 06192   | 06174          | 06156 | 0   | 0.01506        | 01497             | 01489 | 01480          | 01472          | 0146  |
| 1   | 06138          | 06120          | 06102          | 06084   | 06066          | 06048 | 1   | 01455          | 01447             | 01439 |                | 01422          | 0141  |
| 2   | 06030          | 06012          | 05995          | 05977   | 05959          | 05941 | 2   | 01406          | 01398             |       |                | 01573          | 0136  |
| 3   | 05924          | 059.16         | 05888          | 05871   | 05853          | 05836 | 3   | 01357          | 01349             | 01341 | 01333          | 01325          | 0131  |
| 4   | 05818          | 05801          | 05783          |         | 05748          | 05731 | 4   |                | 01302             | 01294 | 01286          | 01278          | 0127  |
| 5   | 05714          | 05696          | 05679          |         | 05645          |       | 5   |                | 01255             | 01247 | 01240          | 01232          | 0122  |
| 6 7 | 05610          | 1 2 2 2 2 2    | 05576          |         | 05542          |       | 6   |                | 01209             | 01202 | 01194          | 01187          | 0117  |
| 8   | 05508<br>05406 | 05491          | 05474<br>05373 | 05457   | 05440          |       | 7 8 |                | 01164             | 01157 | 01150          | 01142          |       |
| . 9 | 05306          | 05389<br>05290 | 05273          | 05257   | 05940<br>05940 |       | 9   | 01084          | 01120             | 01113 | 01106<br>01063 | 01099          | 0109  |
| -   | -              |                |                |         |                |       | _   |                |                   |       |                |                |       |
| 10  |                | 05191          | 05174          | 05158   |                | 05125 |     | 0.01042        |                   | 01028 | 01021          | 01014          | 0100  |
| 11  | 05109          | 05098          | 05076          |         | 05044          |       | 11  |                | 00993             | 00987 | 00980          | 00973          | 0096  |
| 13  | 04916          | 04996          | 04980          | 04964   | 04948          | 0:837 | 13  |                | 00933             | 00946 | 00940          | 00938          | 0092  |
| 14  | 04821          | 04900          | 04789          | 04774   | 04758          | 04743 | 14  |                | 00874             | 00868 | 00862          | 00855          | 0083  |
| 15  | 04727          | 04711          | 04696          |         | 04665          | 04649 | 15  |                | 00836             | 00830 | 00824          | 00818          | 0081  |
| 15  | 04634          | 04619          |                | 04588   | 04573          |       | 16  |                | 00799             | 00793 |                | 00781          | 0077  |
| 17  | 04542          | 04527          | 04512          | 04-196  | 04481          | 04466 | 17  |                | 00763             | 00757 | 00751          | 00745          | 0078  |
| 18  | 04451          | 04436          | 04421          | 04406   | 04591          | 04376 | 18  | 00733          | The second second | 00721 | 00716          | 00710          | 0070  |
| 19  | 04361          | 04346          | 04882          | 04317   | 04302          | 04287 | 19  | 00699          | 00693             | 00687 | 00682          | 00676          | 0067  |
| 20  | 0.04272        | 04258          | 04243          | 0.1998  | 04214          | 01199 | 90  | 0.00665        | 00659             | 00654 | 00648          | 00643          | 006:  |
| 21  | 04185          | 04170          | 04155          | 04141   | 04127          | 04112 | 21  | 00632          | 00626             | 00621 | 00616          | 00610          | 0060  |
| 22  | 04098          | 04083          | 04069          | 04055   | 04040          |       | 22  | 00600          | 00594             | 00589 | 00584          | 00579          | 0057  |
| 23  | 04012          | 03998          | 03983          |         |                |       | 23  | 00.568         | 00568             | 00558 | 00553          | 00548          | 0054  |
| 24  | 03927          | 03918          | 03899          | 03885   | 03871          | 03857 | 24  | 00538          | 00538             | 00528 | 00528          | 00518          | 0051  |
| 25  | 03843          | 03829          | 03815          | 03802   | 03788          |       | 25  | 00508          | 00504             | 00499 | 00494          | 00489          | 0048  |
| 26  | 03760          | 03746          | 03733          |         | 0.10           |       | 26  | 00480          |                   | 00470 | 00466          | 00461          | 0045  |
| 27  | 03678          | 03665          | 03651          | 03638   |                |       | 27  | 00452          | 00447             | 00448 | 00438          | 00494          | 0045  |
| 28  | -03597         | 03584          | 03571          | 03557   |                | 03531 | 28  | 00425          | 00420             | 00416 | 00412          | 00407          | 0040  |
| 29  | 03517          | 03504          | 03491          | 03478   | 03465          | 08452 | 29  | 00399          | 00394             | 00390 | 00386          | 00382          | 0037  |
| 30  | 0.03438        | 09425          | 03112          | 03399   |                | 03373 | 30  | 0.00373        | 00369             | 00365 | 00361          | 00357          | 0035  |
| 31  | 03360          | 03348          | 03335          | 03322   |                | 03296 | 31  | 00349          | 00345             | 00341 | 00337          | 00333          | GO:3: |
| 32  | 03283          | 03271          | 03258          | 03245   | 03235          |       | 82  | 00325          | 00321             | 00317 | 00313          | 00310          | 0030  |
| 33  | 03207          | 03195          | 03182          | 03170   | 03157          | 03145 | \$3 |                |                   | 00295 | 00291          | 00287          | 0028  |
| 34  | 03132          |                | 03107          |         | 03083          |       | 34  | 00280          |                   | 00273 |                | 00266          | 0026  |
| 35  | 03058<br>02985 | 03046          | 03034          | 1000000 | 03009          | 02997 | 35  | 00259          | 00255             | 00252 | 00249          | 00245          | 0024  |
| 37  | 02913          | 02901          | 02889          | 02949   | 02865          | 02853 | 36  | 00239<br>00219 | 00235<br>00216    | 00232 | 00229          | 00225<br>00207 | 0022  |
| 38  | 02841          | 02829          | 02818          | 02806   | 02794          |       | 38  | 00219          | 00197             | 00194 | 00191          | 00188          | 0018  |
| 39  | 02771          | 02759          | 02748          | 02736   | 02724          |       | 39  | 00183          | 00180             | 00177 | 00174          | 00171          | CO16  |
| 40  | 0.00701        | 02690          | 00270          | Oucen   | noere          | 00041 | _   |                |                   |       |                |                | 0017  |
| 41  | 0.02701        | 02690          | 02678          | 02667   | 02656          | 02644 |     | 0.00166        | 00163             | 00160 |                | 00155          |       |
| 42  | 02565          | 02554          | 02543          | 02539   | 02521          | 02510 | 41  | 00149<br>00134 | 00147             | 00144 | 00142          | 00139          | 0019  |
| 43  | 02499          | 02488          | 02477          | 02466   | 02455          | 02444 | 43  | 00134          | 00132             | 00115 | 00137          | 00110          |       |
| 44  | 02433          | 02422          | 02411          | 02400   | 02390          |       | 44  | 00106          | 00104             | 00102 | 00099          |                |       |
| 45  | 02368          | 02357          | 02347          | 02036   | 02326          | 02315 | 45  | 00093          | 00091             | 00089 | 00087          | 00035          |       |
| 46  | 02304          | 02294          | 02283          | 02273   | 02262          | 02252 | 46  | 00081          | 00079             | 00077 | 00075          |                | 0007  |
| 47  | 02241          | 02231          | 02221          | 02210   | 02200          | 02190 | 47  | 00070          | 00068             | 00066 | 00065          | 00063          | 0006  |
| 48  | 02179          |                | 02159          |         | 02139          |       | 48  | 00060          | 00058             | 00056 | 00055          | 00053          | 0005  |
| 49  | 02118          | 02108          | 02098          | 02088   | 02078          | 02063 | 10  | 00050          | 00049             | 00047 | 00046          | 00044          | 0004  |
| 50  | 0.02058        | 02048          | 02038          | 02028   | 02018          | 02009 | 50  | 0.00041        | 00040             | 00039 | 00037          | 00036          | 0005  |
| 51  | 01999          |                | 01979          |         |                |       | 51  |                |                   |       |                | 00029          |       |
| 52  | 01940          | 01931          | 01921          | 01912   | 01902          | 01892 | 52  |                |                   |       |                | 00022          |       |
| 53  |                |                | 01864          |         |                |       |     |                |                   |       | 00017          |                |       |
| 54  |                |                | 01808          |         |                |       |     |                |                   |       |                | 00012          |       |
| 55  |                |                | 01752          |         |                |       |     |                |                   |       |                | 00008          |       |
| 56  | 01716          | 01707          | 01698          | 01689   | 01680          | 01671 | 56  | 00007          |                   |       |                | 00003          |       |
| 58  |                |                | 01644<br>01591 |         |                |       |     |                |                   |       |                | 00002          |       |
| 59  |                |                | 01540          |         |                |       |     |                |                   |       |                | 00000          |       |
| 20  | 10011          | 01010          | 31310          | 01001   | 01020          | 01014 | 109 | 00000          | CAUCA             | COOO  | COOL           | 00000          | OUN   |

TABLE XXXVI.

|          |   | <del></del>             |                         |                         | Argume                 | nt. M                            | IDI      | OLE TIN        | Æ.             | <del></del>             | ···                     | ***********             |                |
|----------|---|-------------------------|-------------------------|-------------------------|------------------------|----------------------------------|----------|----------------|----------------|-------------------------|-------------------------|-------------------------|----------------|
|          |   |                         | οH                      |                         |                        |                                  |          |                |                | 1 Ho                    |                         |                         |                |
| VI.      | 0"                                      | 10"                     | 20"                     | 30"                     | 40"                    | 50"                              | М.       | 0"             | 10″            | 20"                     | 30″                     | 40″                     | 501            |
|          | 0.00000                                 | 16270                   | 46373                   | 63982                   | 76476                  | 86167                            | 0        |                | 71521          | 71638                   |                         | 71872                   | 71988          |
| 1<br>2   | 2.94085<br>3.24187                      | 00779<br>27663          | 06578<br>30882          | 11694<br>33878          | 16269<br>36681         | 20408<br>3931a                   | 1 2      | 72104<br>72793 | 72220<br>72907 | 72335<br>73020          | 72450<br>73133          | 72565<br>73246          | 72679<br>73358 |
| 3        | 41796                                   |                         | 46371                   | 48490                   |                        |                                  | 3        | 73470          | 73582          |                         | 73133                   | 73916                   | 74027          |
| 4        | 54289                                   | í .                     | 57764                   |                         | 60982                  | 62506                            | 4        | 74137          | 74247          | 74357                   | 74466                   | 74575                   | 74684          |
| 5        | 63978                                   | 65402                   | 66781                   |                         |                        |                                  | 5        | 74792          | 74900          | 75008                   | 75116                   |                         | 75330          |
| 6<br>7   | 71895                                   |                         | 74242                   |                         |                        |                                  | 6        | 75437          | 75544          | 75650                   | 75756                   | 75862                   | 75967          |
| 8        | 78588<br>84385                          | 79609<br>85280          | 80607<br>861 <i>5</i> 7 | 81 <i>5</i> 83<br>87017 | 82537<br>87860         | 83471<br>88686                   | 8        | 76072<br>76697 | 76177<br>76800 | 76281<br>76903          | 76385<br>77006          | 76489<br>77108          | 76593<br>77210 |
| 9        | 89498                                   | 90294                   | 91076                   |                         | 92600                  | 93341                            | 9        | 77312          | 77413          |                         | 77615                   | 77716                   | 77817          |
| 10       | 3.94071                                 | 94788                   | 95494                   | 96188                   | 96872                  | 97545                            | 10       | 4.77917        | 78017          | 78117                   | 78217                   | 78316                   | 78415          |
| 11       | 98207                                   | 98860                   | 99503                   |                         | 00761                  | 01576                            | 11       | 78514          | 78613          | 78711                   | 78809                   |                         | 79004          |
| 12       | 4.01983                                 |                         | 03172                   |                         |                        | 04896                            | 12       |                | 79198          |                         | 79392                   | 79488                   | 79584          |
| 13       | 05456<br>08671                          | 06008                   | 06554                   | 07093<br>10193          |                        | 08251<br>11178                   | 13<br>14 | 79680<br>80251 | 79776<br>80345 | 79871<br>80439          | 79966<br>80533          | 80061<br>80627          | 80156<br>80720 |
| 15       | 11663                                   | 12142                   | 12616                   |                         |                        |                                  | 15       | 80813          | 80996          |                         | 81091                   | 81183                   |                |
| 16       | 14461                                   | 14911                   | 15355                   | 15796                   |                        | 16663                            | 16       | 1              |                |                         | 81641                   | 81732                   |                |
| 17       | 17090                                   |                         | 17932                   |                         | 18757                  | 19164                            | 17       | 81914          |                |                         | 82184                   |                         |                |
| 18<br>19 | 19567                                   |                         | 20363                   |                         | 21148                  | 21528                            | 18       | 82453          | 82542          |                         | 82720                   | 82808                   | 82896          |
|          | 21910                                   | 22289                   | 22664                   | 23036                   | 23405                  | 23770                            | 19       | 82984          | 83072          | 83160                   | 83247                   | 83334                   | 83421          |
| 20       | 4.24333                                 | 24499                   | 24849                   | 25209                   | 25553                  | 25901                            |          | 4.83508        | 83595          | 83682                   | 83768                   | 83854                   | 83940          |
| 21<br>22 | 26246<br>28260                          |                         | 26928<br>28911          | 27265<br>29233          | 27599<br>29553         | 27931<br>29870                   | 21<br>22 | 84026<br>84536 | 84111<br>84620 | 84196<br>84704          | 84281<br>84788          | 84366<br>84872          |                |
| 29       | 30185                                   | ,                       | 30807                   | 31115                   |                        | 31725                            | 23       | 85039          | 85122          |                         | 85388                   | r                       | 85454          |
| 24       | 32026                                   |                         | 32623                   |                         | 33212                  | 33503                            | 24       | 85536          | 85618          | 85700                   | 85782                   |                         |                |
| 25       | 33793                                   | , ,                     | 34365                   |                         | 34931                  | 95211                            | 25       | 86026          | 86107          |                         | 86269                   | 86350                   |                |
| 26       | 35489                                   |                         | 36040                   |                         | 36584                  | 36853                            | 26       | 86510          |                |                         | 86750                   |                         | 86910          |
| 27<br>28 | 37121<br>38692                          | 37387<br>38949          | 37651<br>39204          | 37914<br>39 <b>4</b> 57 | 38175<br>39 <b>709</b> | 38 <b>4</b> 54<br>39 <b>9</b> 60 | 27<br>28 | 86989<br>87460 |                | 87147<br>87616          | 87226<br>87694          | 87304<br>87772          |                |
| 29       | 40209                                   | 40456                   | 40702                   | 40947                   | 41190                  | 41432                            | 29       | 87927          | 88004          | 88081                   | 88158                   | 88235                   | 88311          |
| 30       | 4.41678                                 | 41912                   | 42150                   | 42386                   | 42622                  | 42856                            | -        | 4.88387        | 88463          | 88539                   | 88615                   | 88691                   | 88767          |
| 31       | 43088                                   |                         |                         |                         | 44007                  | 44233                            | 31       | 88842          | 88917          | 88992                   | 89067                   |                         |                |
| 32       | 44459                                   | 44683                   | 44906                   |                         | 45348                  | 45568                            | 32       | 89291          | 89365          | 89439                   | 89513                   | 89587                   | 89661          |
| 33       | 45786                                   |                         |                         | 46434                   |                        | 46861                            | 33       | 89735          | 89808          | 89881                   | 89954                   |                         | 90100          |
| 34<br>35 | 47073<br>48323                          |                         | 47494<br>48731          | 47702<br>48934          |                        | 48117                            | 34       | 90173<br>90606 | 90246<br>90678 | 90318<br>907 <i>5</i> 0 | 90390<br>90821          | 90462<br>90892          | 90594<br>90963 |
| 36       | 49536                                   |                         | 49933                   |                         |                        | 49336<br>50522                   | 36       | 91034          |                | 91176                   | 91247                   |                         | 91387          |
| 37       | 50716                                   | 50910                   |                         | 51294                   | 51485                  | 51675                            | 37       | 91457          | 91527          | 91597                   | 91667                   | 91737                   | 91807          |
| 38       | 51864                                   |                         | 52240                   |                         | 52612                  | <b>5</b> 2797                    | 38       | 91876          |                |                         | 92083                   | 92152                   | 92221          |
| 39       | 52981                                   | 53165                   | 53347                   | 53529                   | 53710                  | 53891                            | 39       | 92290          | 92358          | 92426                   | 92494                   | 92562                   | 92630          |
| 40       | 4.54070                                 | 54249                   | 54427                   | 54604                   | 54780                  | 54956                            |          | 4.92698        |                |                         | 92901                   | 92968                   | 93035          |
| 41<br>42 | 55131<br>56166                          | 55306<br>56336          | 55479<br>56506          | 55652<br>56674          | 55824<br>56842         |                                  | 41       | 93102<br>93501 | 93169<br>93567 |                         | 93303<br>9 <b>369</b> 9 | 93369                   | 93435<br>93831 |
| 43       | 57177                                   |                         | 57508                   |                         |                        | 57010<br>58000                   | 45       | 93301          |                | 94027                   | 94092                   | 93765<br>94157          | 94222          |
| 44       | 58163                                   |                         | 58487                   | 58648                   | 58808                  | 58968                            | 44       |                | 94352          |                         | 94481                   | 94545                   | 94609          |
| 45       | 59127                                   |                         | 59448                   | 59600                   | <i>5</i> 97 <i>5</i> 7 | <b>5</b> 9913                    | 45       | 94673          | 94737          | 94801                   | 94865                   | 94929                   | 94993          |
| 46       | 60069                                   |                         | 60378                   | f0532                   | 60683                  | 60838                            | 46       |                | 95119          | 95182                   | 95245                   | 95308                   | 95371          |
| 47<br>48 | 60990<br>61891                          | 61141<br>62039          | 61292<br>62187          | 61443<br>62334          | 61593<br>62481         | 61742<br>62627                   | 47<br>48 |                | 95497<br>95869 | 95559<br>95931          | 95621<br>95993          | 95683<br>96055          | 95745<br>96117 |
| 49       | 62773                                   |                         | 63063                   | 63207                   | 63351                  | 63494                            | 49       |                | 96239          | 96300                   | 96361                   | 96422                   | 96483          |
|          | 4.63637                                 | 63779                   | 63921                   | 64062                   | 64208                  |                                  | 50       | 4.96544        | 96605          | 96665                   |                         |                         | 96845          |
| 51       |   | 64622                   |                         |                         | 65037                  | 65175                            | 51       |                |                | 97026                   |                         | 97145                   | - 18           |
| 52       |   | 65448                   |                         |                         | 65855                  | 65990                            | 52       |                |                | 97383                   | 97442                   | 97501                   | 97560          |
| 58<br>54 |   | 66259<br>670 <b>5</b> 8 |                         |                         | 66658<br>67444         | 66790<br>67 <b>5</b> 74          | 53<br>54 | 97618          | 97677<br>98027 |                         | 97794<br>98143          | 97853<br>98201          | 97911<br>98259 |
| 55       |   | 67852                   |                         |                         |                        | 68344                            |          |                | 98374          |                         | 98489                   | 98546                   | 98603          |
| 56       | 68871                                   | 68597                   | 68723                   | 68849                   | 68974                  | 69099                            | 56       | 98660          | 98717          | 98774                   | 98831                   | 98887                   | 98944          |
| 57       |   | đ9348                   |                         | 69595                   | 69718                  |                                  |          |                | 99057          |                         | 99169                   |                         |                |
| 58<br>59 |   | 70085<br>70809          |                         | 70328<br>71047          |                        |                                  |          | 99337          | 99393          | 99448                   | 99504                   | 99 <b>35</b> 9<br>99890 |                |
| -11      | , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | 10009                   | 10020                   | 1104/                   | /1100(                 | 11200                            | 09       | 33010          | 30120          | 35100                   | 330301                  | 990301                  | 23373          |
|          |   |                         |                         |                         |                        |                                  |          |                |                |                         |                         |                         |                |

|          |                |                |  |                | Argum          | ent. I         | MID | D   | LE TI          | ME.            |                |  |                |                |
|----------|----------------|----------------|--|----------------|----------------|----------------|-----|-----|----------------|----------------|----------------|--|----------------|----------------|
| 1        | -              |                | 2 Ho   |                |                |                | 1   | 1   |                |                |                | ours.  |                |                |
| M        | 0"             | 10"            | 20"  | 30"            | 40//           | 50V            | N   | 1.  | 0"             | 10"            | 201            | 30"  | 40"            | 50"            |
| 0        |                |                |  |                | 00218          |                |     |     | 5.1505:        |                |                |  |                | 7 1520         |
| 1        | 00337          |                | 00435  | 1 2 2 2 2 2    |                |                |     | 1   | 15240          |                |                |  |                |                |
| 2        | 00650          |                |  | 00810          |                |                |     | 2   | 1542           |                |                |  |                |                |
| _ 3      |                |                | 1  |                |                |                |     | 3   | 1561:          |                | 1              |  |                |                |
| -4       |                | 1              | 1  |                | 01496          |                |     | 1   | 15790          |                |                |  |                |                |
| 5        |                |                |  |                | 01808          | 01860          |     | 5   | 1.5979         |                |                |  | 1              |                |
| 6        |                |                | 02014  |                | 02117          | 02168          |     | 6   | 16159          |                |                |  |                |                |
| 7        |                |                |  | 02372          | 02423          |                |     | 7   | 16338          |                | 1              |  |                |                |
| 8        |                |                |  | 02675          | 02725          | 03075          | 11  | 9   | 16516          |                |                |  |                |                |
| 9        | -              |                |  | 02976          | 05026          |                | -   |     | 16692          |                | -              | -  | 16808          | 1683           |
|          | 5.03125        |                |  | 03273          |                |                |     |     |                | 16895          |                |  |                | 1              |
| 11       | 03421          |                | 03519  |                | 03617          | 03665          | 11  | - 1 | 17039          | 4              |                |  |                |                |
| 12       |                |                |  | 03859          | 03908          |                |     | -1. | 17210          |                |                |  | 1              |                |
| 13       |                |                | 04100  |                | 04196          | 04244          |     |     | 17380          |                |                |  |                |                |
| 14       | 04292          |                |  |                | 04482          | 04530          |     |     | 17549          |                |                |  |                |                |
| 15       | 04577          | 04624          | 04671  |                | 04765          | 04812          |     |     | 17716<br>17881 | 17743<br>17908 |                |  | 1              |                |
| 16<br>17 | 04859<br>05139 |                | 05231  | 04999<br>05278 | 05046          | 05092          | 11  |     | 18045          |                | 1              |  |                |                |
| 18       | 05139          |                |  | 05553          |                | 05645          |     |     | 18208          |                |                |  |                |                |
| 19       | 05690          | 05736          | 05781  | 05827          | 05872          | 05917          | 15  |     | 18369          |                |                |  | 18475          |                |
| -        | 5.05962        | 06007          | 06052  | 06097          | 06142          | 06187          | -   |     | . 18528        | 18555          |                |  | 18634          | -              |
| 21       | 06232          | 06275          | 06321  | 06365          | 06410          | 06454          | 21  |     | 18687          |                |                | The state of the s |                | 18660          |
| 22       | 06498          |                |  | 06631          | 06675          | 06719          | 29  |     | 18844          | 18870          |                |  |                |                |
| 23       | 06763          |                | 06851  | 06894          | 06938          | 06981          | 20  | - 1 | 18999          |                |                | 19076  | 19102          |                |
| 24       | 07025          |                | 07112  | 07155          | 07198          | 07241          | 24  |     | 19153          |                |                |  |                |                |
| 25       | 07284          | 07328          |  | 07413          | 07456          | 07499          | 25  |     | 19306          |                | 19357          |  | 19407          |                |
| 26       | 07542          | 07584          | 07627  |                | 07712          | 07754          | 26  | ;   | 19457          | 19483          |                |  |                |                |
| 27       | 07797          | 07839          | 07881  | 07923          | 07965          | 08007          | 27  |     | 19608          | 19632          | 19657          | 19682  | 19707          | 19732          |
| 28       | 08049          | 08091          | 08133  | 08175          | 08216          | 08258          | 28  | 3   | 19756          | 19781          | 19806          | 19831  | 19855          | 19879          |
| 29       | 08300          | 08341          | 08383  | 08424          | 08465          | 08507          | 29  |     | 19904          | 19928          | 19952          | 19977  | 20001          | 20025          |
| 30       | 5.08548        | 08589          | 08680  | 08671          | 08712          | 08753          | 30  | 5   | .20050         | 20074          | 20098          | 20122  | 20146          | 20170          |
| 31       | 08794          | 08834          | 08875  | 08916          | 08956          | 08997          | 31  | 1   | 20194          | 20218          | 20242          | 20266  | 20290          | 20314          |
| 32       | 09037          | 09078          | 09118  |                |                | 09229          | 32  |     | 20338          | 20362          | 20385          | 20409  | 20433          | 20456          |
| 33       | 09279          |                |  | 09399          |                | 09478          | 33  |     | 20480          | 20404          | 20527          | 20551  | 20574          | 20597          |
| 34       | 09518          | 09558          |  |                |                | 09716          | 34  |     | 20621          | 20644          | 20668          |  | 20714          | 20737          |
| 35       | 09755          |                | 09834  |                | 4              | 09951          | 35  |     | 20760          | 20783          | 20807          |  | 20853          | 20876          |
| 36       | 09990          | 10029          | 10068  |                |                | 10184          | 36  | 1   | 20899          | 20922          | 20945          |  | 20990          |                |
| 37       | 10223          | 10262          | 10300  |                | 10377          | 10416          | 37  |     | 21036          | 21059          | 21081          | 21104  | 21127          | 21149          |
| 38       | 10454<br>10683 | 10492          | 10531<br>10759   |                | 10607<br>10834 | 10645<br>10872 | 38  |     | 21172<br>21306 | 21194<br>21329 | 21217          | 21239<br>21375   | 21261          | 21284          |
| -        |                | -              |  | -              |                |                | -   | -   |                |                |                |  | 21895          |                |
| 100      | 11135          | 10947<br>11172 | 10985<br>11209   |                |                | 11097<br>11320 | 40  | 5   | 21439<br>21572 | 21462<br>21593 | 21484          | 21506  | 21528          | 21550          |
| 41       | 11357          | 11394          |  |                |                | 11542          | 42  |     | 21702          | 21724          | 21615<br>21746 | 21637<br>21767   | 21659          | 21681          |
| 43       | 11578          | 11615          |  |                |                | 11761          | 43  |     | 21832          | 21853          | 21875          | 21896  | 21789<br>21918 | 21810<br>21939 |
| 44       | 11797          | 11834          | A STATE OF THE STA |                |                | 11979          | 44  |     | 21960          | 21982          | 22003          | 22024  | 22045          | 21939          |
| 45       | 12014          | 12050          |  |                |                | 12194          | 45  |     | 22088          | 22109          | 22130          | 22151  | 22172          | 22193          |
| 46       | 12229          | 12265          |  |                |                | 12407          | 46  |     | 22214          | 22235          | 22255          | 22276  | 22297          | 22318          |
| 47       | 12443          | 12478          |  |                |                | 12619          | 47  |     | 22338          | 22359          | 22380          | 22400  | 22421          | 22442          |
| 48       | 12654          | 12689          |  |                |                | 12829          | 48  |     | 22462          | 22483          | 22503          | 22524  | 22544          | 22564          |
| 49       | 12864          | 12898          | 12933  | 12968          | 13002          | 13037          | 49  |     | 22585          | 22605          | 22625          | 22645  | 22666          | 22686          |
| 50 5     | 13071          | 13106          | 13140  | 13175          | 13209          | 18243          | 50  | 5.  | 22706          | 22725          | 22746          | 22766  | 22786          | 22806          |
| 51       |                | 13311          |  |                |                |                | 51  |     | 22826          | 22846          | 22866          | 22886  | 22906          | 22925          |
| 52       |                | 13515          |  |                |                |                |     |     | 22945          | 22965          | 22984          | 23004  | 23024          | 23043          |
| 53       | 13684          | 13717          | 13751  | 13784          | 13818          | 13851          | 5.0 |     |                | 23082          |                |  | 23141          |                |
| 54       |                | 15917          |  |                |                |                |     |     |                |                |                |  | 23257          |                |
| 55       | 14083          |                |  |                |                |                | 55  |     | 23295          | 23314          | 23333          | 23352  | 23372          | 23391          |
| 56       |                | 14313          |  |                |                |                | 16  |     |                |                |                | 23466  |                |                |
| 57       | 14475          |                |  |                |                |                |     |     |                |                |                | 28579  |                |                |
| 58       | 14669          |                |  |                |                |                |     |     |                |                |                | 23691  |                |                |
| 39 5     | . 14861        | 14893          | 14925  | 14957          | 14988          | 15020          | 25  |     | 23746          | 23 (65]        | 23/83          | 23801  | 28820          | 23838          |
| di       | -              | -              | 1000   | -              |                | 110            |     |     |                |                |                |  | -              |                |

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#### TABLE XXXVI.

|          | Argument. MIDDLE TIME. 4 Hours. 5 Hours. |                       |         |               |               |                |        |          |         |                |               |                |        |  |
|----------|--|-----------------------|---------|---------------|---------------|----------------|--------|----------|---------|----------------|---------------|----------------|--------|--|
|          | 1  |                       | 4 Ho    | urs.          | ,             |                |        |          |         | 5 Ho           | urs.          |                |        |  |
| M.       | 0"                                       | 10"                   | 20"     | 30/           | 40"           | 50/            | M.     | 0"       | 109     | 20"            | 30"           | 40"            | 50"    |  |
| 0        | 5.23856                                  | 23874                 | 23892   | 23911         | 23929         | 25947          | 0      | 5.28597  | 28606   | 28614          | 28623         | 28631          | 28639  |  |
| 1        | 23965                                    | 23983                 | 24001   | 24019         | 24037         | 24055          | 1      | 28648    | 28656   | 28664          | 28673         | 28681          | 28689  |  |
| 2        | 24073                                    | 24091                 | 24108   |               | 24144         | 24162          | 2      | 28697    | 28705   | 28713          | 28722         | 28730          | 28738  |  |
| 5        | 24179                                    | 24197                 | 24215   | 24232         | 24250         | 24267          | 3      | 28746    | 28754   | 28762          | 28770         | 28778          | 28786  |  |
| 4        | 24285                                    | 24802                 | 24320   | 24337         | 24355         | 24372          | 4      | 28793    | 28801   | 28809          | 28817         | 28825          | 28833  |  |
| 5        | 24389                                    | 24407                 | 24424   | 24441         | 24458         | 24476          | 5      | 28840    | 28848   | 28856          | 28863         | 28871          | 28879  |  |
| 6        | 24493                                    | 24510                 | 24527   |               | 24561         |                | 6      | 28886    | 28894   |                | 28909         | 28916          | 28924  |  |
| 7        | 24595                                    | 24612                 | 24629   | 24646         |               | 24680          | 7      | 28931    | 28939   | 28946          | 28953         | 28961          | 28968  |  |
| `8       | 24697                                    | 34714                 | 24730   | 24747         |               | 24780          | 8      | 28975    | 28983   | 28990          | 28997         | 29004          | 29012  |  |
| 9        | 24797                                    | 24813                 | 24830   | 24846         | 24863         | 24879          | 9      | 29019    | 29026   | 29033          | 29040         | 29047          | 29054  |  |
| 10       | 5.24896                                  | 24912                 | 24929   | 24945         | 24961         | 24978          | 10     | 5,29061  | 29068   | 29075          | 29082         | 29089          | 29096  |  |
| 11       | 24994                                    | 25010                 | 25027   | 25043         | 25059         | <b>25</b> 075  | 11     | 29103    | 29110   | 29116          | 29122         | 29130          | 29137  |  |
| 12       | 25091                                    | 25107                 | 25123   | 25139         | 25155         | 25171          | 12     | 29143    | 29150   | 29157          | 29163         | 29170          | 29177  |  |
| 13       | 25187                                    | 25203                 | 25219   | 25235         | 25251         | 25266          | 13     | 29183    | 29190   | 29196          | 29203         | 29209          | 29216  |  |
| 14       | 25282                                    | 25298                 | 25314   | 25329         | 25345         |                | 14     | 29222    | 29219   | 29235          | 29241         | 29248          |        |  |
| 1.5      | 25876                                    | 25392                 | 25407   | <b>25</b> 423 | 25438         | 25454          | 15     | 29260    | 29267   | 29273          | 29279         | 29285          | 29292  |  |
| 16       |  | 25484                 | 25500   | 25515         | 25530         |                | 16     | 29298    | 29304   | 29310          |               | 29322          | 29328  |  |
| 17       | 25561                                    | 25576                 | 25591   | 25607         | 25622         |                | 17     | 29334    | 29340   | 29346          | 29352         | 29358          | 29364  |  |
| 18       | 25652                                    | 25667                 | 25682   | 25697         | 25712         |                | 18     | 29370    |         | 29381          | 29387         | 29393          |        |  |
| 19       | 25742                                    | 25757                 | 25771   | 25786         | 25801         |                | 19     | 29404    | 29410   | 29416          | 29421         | 29427          | 29433  |  |
| 20       | 5.25831                                  | 25845                 |         | 25875         | 25889         | 25904          |        | 5.29438  | 29444   | 29449          |               | 29460          |        |  |
| 21       | 25918                                    | 25933                 | 25948   | 25962         | 25976         | 25991          | 21     | 29471    | 29477   | 29482          | 29487         | 29493          | 29498  |  |
| 22       | 26005                                    | 26020                 | 26034   | 26048         | 26063         | 26077          | 22     | 29503    | 29509   | 29514          | 29519         | 29524          |        |  |
| 23       |  | 26105                 |         |               | 26148         | 26162          | 23     | 29535    | 29540   | 29545          | 29550         | 29555          |        |  |
| 24       |  | <b>2</b> 619 <b>0</b> | 1       |               | 26232         | 26246          | 24     | 29565    | 29570   | 29575          | 29580         | 29585          |        |  |
| 25       |  |                       | 26288   | 26301         | 26315         | 26329          | 25     | 29595    | 29599   | 29604          | <b>29</b> 609 | 29614          | 1      |  |
| 26       |  |                       | 26370   |               | 26397         | 26411          | 26     | 29623    | 29628   | 29633          | 29637         | 29642          |        |  |
| 1.7      |  | 26438                 | 26452   |               | 26479         | 26492          | 27     | 29651    | 29656   | 29660          | 29665         | 29669          |        |  |
| 28       |  | 26519                 | 26532   | [             | 26559         | 26572          | 28     | 29478    | 29683   | 29687          | 29691         | 29696          |        |  |
| : 9      | 26586                                    | 26599                 | 26612   | 26625         | 26638         | 26651          | 29     | 29704    | 29769   | 29713          | 29717         | 29721          | 29726  |  |
| 30       | 5.26665                                  | 26678                 | 26691   | 26704         | 26717         | 26730          | 30     | 5.29750  | 29734   | 29738          | 29742         | 29746          | 29750  |  |
| 31       | /26743                                   | 26755                 | 26768   | 26781         | 26794         | 26807          | 31     | 29754    | 29758   | 29762          | 29766         | 29770          | 29774  |  |
| 32       | 26820                                    | 26832                 | 26845   | 26858         | 26870         | <b>26</b> 883  | 32     | 29778    | 29782   | 29786          | 29790         | 29793          | 29797  |  |
| 33       | 26896                                    | 26908                 | 26921   | 26933         | 26946         | 26958          | 33     | 29801    | 29805   | 29808          | 29812         | 29816          | 29819  |  |
| 34       |  | 26983                 | 26995   | 27008         | 27020         | 27033          | 34     | 29823    | 29827   | 29830          | 29834         | 29837          |        |  |
| 35       | 27045                                    | 27057                 | 27069   | 27082         | 27094         | 27106          | 35     | 29844    |         | 29851          | 29854         | 29858          |        |  |
| 36       |  |                       |         |               | 27166         | 27178          | 36     | 29864    |         | 29871          | 29874         | 29878          |        |  |
| 37       |  |                       |         |               | <b>27</b> 238 | 27250          | 37     | 29884    |         | 29890          |               | 29896          |        |  |
| 38       |  |                       |         | 27297         | 27309         | 27320          | 38     | 29903    |         | 29909          | 29912         | 29915          |        |  |
| 39       | 27332                                    | 27344                 | 27355   | 27367         | 27379         | 27390          | 39     | 29920    | 29923   | 29926          | 29929         | 29932          | 29935  |  |
|          | 5.27402                                  |                       |         |               | 27447         | 27459          |        | 5.29937  |         | 29943          | 29946         | 29948          | 29951  |  |
| 41       |  |                       | 27493   |               | 27515         | 27526          | 41     | 29954    |         | 2995 <b>9</b>  | 29961         | 29964          | 29966  |  |
| 42       |  |                       |         | 27571         | 27582         | 27593          | 42     | 29969    |         | 29974          | 29976         | 29979          |        |  |
| 43       |  |                       |         |               |               | 27659          | 43     |          |         | 29988          | 29990         | 29993          |        |  |
| 44       |  |                       |         |               |               | 27724          | 44     |          |         | 30001          | 30004         | 30006          |        |  |
| 45       |  |                       |         |               |               |                | 45     |          |         | 30014          | 30016         | 30018          | 30020  |  |
| 46       |  |                       | 1       |               |               |                | 46     |          | 30024   | 30026          | 30028         | 30029          | 30051  |  |
| 47       |  |                       |         |               |               |                | 47     |          |         | 30037          | 30038         | 30040          |        |  |
| 48       |  |                       | •       |               |               | 27975          | 48     |          | 30045   | 30047          | 30048         | 30050          | 30051  |  |
| 49       |  | ļ                     | !       |               |               | 28035          | 49     |          | <u></u> | 300.56         |               | 30059          | 30060  |  |
|          | 5.28045                                  |                       |         |               |               | 28094          |        | 5.30062  |         |                |               | 30067          |        |  |
| 51<br>52 |  | 28114                 |         |               |               | 28153          | 51     |          |         |                |               | 30074          |        |  |
|          | 28168<br>28220                           |                       |         |               |               |                | 52     |          | 30078   |                |               | 30081          | 30082  |  |
| 54       |  |                       |         |               |               | 28267<br>28323 |        |          |         |                |               | 30086          | 30087  |  |
| 55       |  |                       |         |               |               |                |        |          | 30089   |                |               | 30091          | 30092  |  |
| 56       |  |                       | 28405   |               |               | 28432          | 56     |          |         | 30094<br>30097 |               | 30095<br>30098 | 30096  |  |
| 57       |  |                       |         | 1             | 28477         |                | 57     |          |         |                |               | 30101          |        |  |
| 58       |  |                       | 28512   |               |               |                | 38     |          |         |                | 30100         |                | 30101  |  |
|          | 5.28546                                  | 28555                 | 28563   | 28579         | 28580         | 28580          |        | 5.30103  |         |                |               |                |        |  |
| 1        |  |                       | . 20000 | , 20012       | - 25,000      | 20000          | 1 1/1/ | 10.00100 | 10103   | , 30103        | 5010.5        | 50103          | 50 233 |  |
| ı '      |  | ****                  |         |               |               |                | •      |          |         | •              |               |                |        |  |

|              |                | ′              |                |                         | Arg            | gument          | R        | ISING.         |                        |                |                |                |                |
|--------------|----------------|----------------|----------------|-------------------------|----------------|-----------------|----------|----------------|------------------------|----------------|----------------|----------------|----------------|
|              |                |                | 0 H            | our.                    |                |                 |          |                |                        | 1 Ho           | ur.            |                |                |
| M.           | · 0"           | 10"            | 20′′           | 30"                     | 40"            | 50 <sup>'</sup> | M.       | .0"            | 10"                    | . 20"          | 30//           | 40"            | 50"            |
| 1 0          |                | 4223C          | 02436          | 37654                   | 62642          | 82024           | 0        | 3.53243        | 53482                  | 53721          | 53959          | 54197          | 54434          |
| 1            | 9.97860        | 11250          | 22848          | 33079                   | 42230          | 50509           | 1        | 54670          | 54905                  | 55140          | 55375          | 55608          | 55841          |
|              | J.58066        | 65019          | 71455          | 77448                   | 183054         | 88319           | 2        | 56074          | 56306                  | 56537          | 56767          | 56997          | 57226          |
| 3            | 93284          | 97980          | 02435          | 06673                   | 10714          | 14575           | 3        | 57455          | 57683                  | <b>579</b> 10  |                | 583 <b>6</b> 3 | 58589          |
| 4            | 1.18271        | 21817          | 25224          | 28502                   | 31660          |                 | 4        | 58814          | 59038                  | 59262          | 59486          | 59708          | 5993C          |
| 5            | 37653          | 40501          | 43258          | 45931                   | 48524          | 51041           | 5        | 60152          | 60373                  |                | 60818          | 61032          | 61251          |
| 6 7          | 53488<br>66877 | 55868          | 58184          | 60440                   | 62639          | 64784           | 6        |                | 61686                  |                | 62120          | 62336          | 62551          |
| 8            | 78474          | 68920          | 70917          | 72869                   | 74778          | 76646           | 8        | 62766<br>64043 | 62980<br>64254         | 63194<br>64465 | 63407<br>64675 | 63620<br>64885 | 63832<br>65094 |
| 9            |                |                | 82019<br>91862 | 83739<br>93399          | 85426<br>94909 | 87080<br>96894  | 9        | 65302          | 65510                  | 65717          | 65924          | 66131          | 66337          |
| - <u>-</u> - | l'             |                |                |                         | 31303          |                 |          |                |                        |                | <u>-</u>       |                |                |
| 10           |                |                | 00701          | 02091                   | 03458          | 04805           |          | 3.66542        | 66747                  | 66952          | 67156          | 67359          | 67562          |
| 11           | 2.06131        |                | 08723          | 09991                   | 11240          | 12472           | 11       | 67765          | 67967                  |                | 68369          | 68570          | 6877C          |
| 12           |                |                | 16066          | 17232                   |                | 19517           | 12       |                | 69168                  |                | 69565<br>70745 | 69763<br>70940 | 69961          |
| 14           |                | 21744<br>28100 | 22836<br>29116 | 23915                   |                |                 | 13<br>14 |                | 70354<br>71523         | 70550<br>71716 | 71909          | 72101          | 71135          |
| 1.5          |                |                |                | 301 <b>2</b> 0<br>35910 | 31112<br>36839 |                 | 15       | 72485          | 72676                  | 72867          | 73057          | 73247          | 7343€          |
| 16           |                |                | 40457          | 41338                   | 42211          | 43075           | 16       | 73625          | 73813                  |                | 74189          |                | 74565          |
| 17           |                |                | 45616          | 46447                   | 47270          |                 | 17       | 74750          | 74936                  | 75121          | 75307          | 75491          | 7567€          |
| 18           | 48893          | 49693          | 50486          | 51271                   | 52050          |                 | 18       | 75860          | 76043                  | 76227          | 76409          | 76592          | 76774          |
| 19           | 53586          | 54344          |                | 55841                   | 56580          |                 | 19       | 76955          | 77137                  | 77318          | 77498          | 77678          | 77858          |
| 20           | 2.58039        | 58759          | 59473          | 60182                   | 60885          | 61582           | 20       | 3.78037        | 78216                  | 78395          | 78573          | 78750          | 78928          |
| 21           |                | 62960          |                | 64316                   | 64987          | 65652           | 21       | 79105          | 79282                  | 79458          | 79634          | 79809          | 7998           |
| 22           |                |                | 67617          | 68262                   | 68903          |                 | 22       |                | 80334                  |                |                |                | 81028          |
| 23           |                |                |                | 72036                   | 72649          |                 | 11       |                | 81373                  |                |                | 81888          | 82059          |
| 24           |                | 74464          |                | 75652                   | •              | 76825           | 24       | 82230          | 82400                  | 82570          | 82739          | 82908          | 83077          |
| 25           |                |                | 78555          | 79124                   | 79689          | 80251           | 25       | 83246          | 83414                  |                |                |                | 84085          |
| 26           |                |                |                | 82461                   | 83005          |                 |          |                | 84416                  |                |                |                | 85078          |
| 27           |                |                | 85148          | 85675                   | 86199          |                 | 27       |                | 85406                  | 1              |                |                | 86060          |
| 28<br>  29   |                |                |                | 88773                   | 89279          |                 | 28       | 1              | 8638 <i>5</i><br>87352 |                | 86709<br>87672 | 86870<br>87832 | 87031<br>87991 |
| 23           | ·              | 90779          | 91273          | 91765                   | 92254          | 92740           | 29       | 0/192          | 01332                  | 67313          |                |                | 67991          |
| 30           |                | 93703          |                | 94656                   | 9,5129         | 95599           | 30       |                | 883 <b>0</b> 9         | 88467          | 88625          | 88783          | 88940          |
| 31           |                | 96532          |                | 97454                   | 97912          |                 | 31       |                | 89254                  |                | 89567          | 89723          | 89879          |
| 32           |                |                |                |                         | 00608          |                 |          |                |                        |                |                |                | 90807          |
| 33<br>34     |                |                |                |                         |                |                 | 33<br>34 |                | 91114<br>92028         |                |                | 91572<br>92482 | 91724<br>92635 |
| 35           |                | 04501<br>07001 | 04922          | 05342<br>07819          |                |                 | 11 .     |                | 92932                  |                |                | 93381          | 93530          |
| 36           |                |                |                |                         | 10622          |                 |          |                | 93827                  | 93975          | 94128          | 94271          | 94418          |
| 37           |                |                |                |                         |                |                 | 37       |                |                        | 94859          |                | 95151          | 95297          |
| 38           |                |                |                |                         |                |                 | 38       | 1              | 95588                  | 95733          | 95878          | 96023          | 96167          |
| 39           | 15969          | . 16338        | 16706          | 17072                   | 17437          | 17800           | 39       | 96311          | 96455                  | 96599          | 96742          | 96885          | 97028          |
| 40           | 3.18162        | 18522          | 18881          | 19238                   | 19594          | 19948           | 40       | 3.97170        | 97313                  | 97455          | 97597          | 97738          | 97880          |
| 41           |                | 20653          |                |                         | 21698          |                 | 41       | 1              | 98162                  | 98302          | 4              | 98583          | 98725          |
| 42           |                |                |                |                         | 23753          |                 | 42       | 1              | 99002                  |                | 99280          | 99419          | 99557          |
| 43           |                |                |                |                         | 25759          |                 | 43       | 99696          | 99834                  | 99972          |                | 00247          | 00384          |
| 44           | 26418          |                |                | 27396                   | 27720          | 28042           | 44       | 4.00521        | 00657                  | 00793          |                |                | 01202          |
| 45           |                |                |                |                         |                | 29953           | 45       |                | 01473                  |                |                |                | 02015          |
| 46           |                |                |                | 31202                   | 31512          |                 |          |                |                        |                |                | 02681          | 02814          |
| 47           | 1              |                |                |                         | 33347          |                 | 47       |                | 03080<br>03871         | 03212<br>04003 |                | 03477          | 03608          |
| 48<br>49     |                |                |                | 34847<br>36613          | 35144<br>36903 |                 | 48<br>49 |                | 04656                  |                |                | 04265<br>05045 | 0439£<br>0517£ |
| 1            | 33737          | 30020          | 30321          | 30013                   | 30303          | 37193           | 43       | 01020          |                        | 01.00          |                |                |                |
|              | 3.37482        |                |                |                         |                |                 |          | 4.05304        | 05433                  | 05561          | 05690          | 05818          | 05946          |
| 51           |                |                | 39759          |                         |                |                 |          |                | 06202                  |                |                |                |                |
| 5:<br>5:     |                |                | 41427          |                         |                |                 |          |                | 06965<br>07720         |                |                | 07343<br>08095 |                |
| 5            |                |                | 43064<br>44670 |                         |                | 43871<br>45462  |          |                | 08468                  |                |                | 08840          |                |
| 55           |                |                | 46247          |                         |                | 47024           | 11       |                | 09210                  |                |                | 09578          |                |
| 56           |                |                | 47795          |                         |                |                 |          |                | 09945                  |                |                | 10310          |                |
| 57           |                |                | 49315          |                         |                |                 |          |                | 10678                  |                |                | 11035          |                |
| 58           | 50314          | 50562          | 50809          | 51056                   | 51301          | 51547           | 58       | 11275          | 11395                  | 11515          |                | 11754          |                |
| 59           | 3.51791        | 52035          | 52278          | 52520                   | 52761          | 53002           | 59       | 4.11992        | 1,2111                 | 12229          | 12348          | 12466          | 12584          |
|              |                |                |                |                         |                |                 |          |                |                        |                |                |                |                |

174 TABLE XXXVII.
TO FIND THE LATITUDE BY DOUBLE ALTITUDES, AND THE ELAPSED TIME.

| -   |                |                |       |                | Ar       | gument | . P | USING.           |                |       |                |                   |       |
|-----|----------------|----------------|-------|----------------|----------|--------|-----|------------------|----------------|-------|----------------|-------------------|-------|
| 1   |                |                | 2 Ho  |                |          |        |     | 460000           |                | 3 Ho  |                |                   | 1     |
| I.  | 0/1            | 10"            | 20//  | 30"            | 40"      | 50"    | M.  | 0"               | 10"            | 20//  | 30"            | 40//              | 50    |
| 0   | 4.12702        | 12820          | 12958 | 13055          | 13172    | 13289  | 0   | 4.46671          | 46747          | 46828 | 46899          | 46975             | 470   |
| 1   | 13406          | 13523          | 13640 | 13756          |          |        | 1   | 47127            | 47203          | 47278 | 47354          |                   |       |
| 2   | 14104          | 14920          | 14336 | 14451          | 14566    | 14682  | 2   | 47580            | 47656          | 47731 | 47806          |                   |       |
| 3   | 14797          | 14911          | 15026 |                |          | 15369  | 3   |                  | 48106          | 48180 | 48255          |                   |       |
| 4   | 15483          | 15597          | 15710 |                | 10000000 | 16050  | 4   |                  |                | 48627 | 48701          | 48776             |       |
| 5   | 16163          | 16276          | 16389 | 16501          | 16614    | 16726  | 5   |                  |                | 49071 | 49145          |                   |       |
| 6   | 16838          | 16950          | 17062 | 17173          |          | 17396  |     |                  | 49440          | 49513 | 49586          |                   |       |
| 7   | 17507          | 17618          | 17729 | 17839          |          | 18060  | 7   |                  | 49879          | 49952 | 50025          | 50098             |       |
| 8   | 18171          |                | 18391 | 18500          |          |        | 8   |                  |                | 50388 | 50461          | 50533             |       |
| 9   | 18828          | 18281<br>18938 | 19047 | 19156          |          | 19373  | 9   |                  | 50316<br>50750 | 50822 | 50894          | 50966             |       |
| -   |                | -              |       |                | -        | -      | -   | -                | -              | -     | -              | -                 | -     |
|     | 4.19482 20129  | 19590          | 19698 | 19806<br>20451 | 19914    | 20021  |     | 4.51109          | 51181          | 51259 | 51825<br>51753 | 51396<br>51824    |       |
| 1   |                | 20236          | 20344 |                | 20558    |        | 11  | 51539            | 51610          | 51681 |                |                   |       |
| 2   | 20771          | 20878          | 20984 | 21091          | 21197    | 21303  | 12  |                  | 52037          | 52107 | 52178          |                   |       |
| 3   | 21409          | 21514          | 21620 | 21725          | 21831    | 21986  | 13  | 52390            | 52461          | 52531 | 52601          | 52672             |       |
| 4   | 22011          | 22146          | 22250 | 22355          | 22459    | 22564  | 14  | 52812            | 52882          | 52952 |                |                   |       |
| 5   | 22668          | 22772          | 22876 | 22980          |          | 23187  | 15  |                  | 53301          | 58371 | 53440          |                   |       |
| 6   | 23290          | 23393          | 23496 | 23599          | 23702    | 23805  | 16  | 53648            | 53718          | 53787 | 53856          |                   |       |
| 7   | 28907          | 24010          | 24112 | 24214          | 24316    | 24418  | 17  | 54068            | 54152          | 54201 | 54269          |                   |       |
| 8   | 24520          | 24622          | 24723 | 24825          | 24926    | 25027  | 18  | 54475            | 54544          | 54612 | 54680          |                   |       |
| 9   | 25128          | 25229          | 25330 | 25430          | 25531    | 25631  | 19  | 54885            | 54958          | 55021 | 55089          | 55157             | 55    |
| 0   | 4.25731        | 25831          | 25931 | 26031          | 26131    | 26231  | 20  | 4.55293          | 55360          | 55428 | 55496          | 55563             | 55    |
| 1   | 26330          | 26429          | 26529 | 26628          | 26727    | 26826  | 21  |                  | 55765          | 55832 | 55900          | 55967             | 56    |
| 2   | 26924          | 27023          | 27121 | 27220          | 27318    | 27416  | 22  | 56101            |                | 56235 | 56301          | 56868             |       |
| 3   | 27514          | 27612          | 27710 | 27807          | 27905    | 28002  | 23  | 56501            | 56568          | 56684 |                | 56767             |       |
| 4   | 28099          | 28197          | 28294 | 28391          | 28487    | 28584  | 24  | 56900            | 56966          | 57032 | 57098          | 57164             |       |
| 5   | 28680          | 28777          | 28873 | 28969          | 29065    | 29161  | 25  | 57896            | 57362          | 57428 | 57494          | 57559             |       |
| 6   | 29257          | 29353          | 29449 | 29544          |          |        |     |                  | 57756          | 57821 | 57886          | The second second |       |
| 7   |                | 29925          |       | 30115          | 29639    |        | 26  | 57690            | 58147          | 58212 | 58277          | 58342             |       |
|     | 29830<br>30398 |                | 30020 |                | 30209    | 30304  | 27  | 58082            |                |       |                | 58730             |       |
| 8   | 30963          | 30493          | 30587 | 30681          | 30775    | 30869  | 28  | 58471            | 58536          | 58601 | 58665<br>59052 |                   | 1000  |
| -   |                | 31056          | 31150 | 31243          | 31337    | 31430  | 29  | 58859            | 58923          | 58988 | -              | -                 | -     |
|     | 4.31523        | 31616          | 31709 | 31801          | 31894    | 31987  | 30  |                  | 59308          | 59372 | 59436          | 59500             |       |
| 1   | 32079          | 32171          | 32264 | 32356          | 32448    | 32540  | 31  | 59627            | 59691          | 59755 | 59818          | 59882             | 16.0  |
| 2   | 32631          | 32723          | 32815 | 32906          | 32997    | 33089  | 32  | 60008            | 60072          | 60135 | 60198          |                   |       |
| 3   | 33180          | 33271          | 33362 | 33453          | 33543    | 33634  | 33  | 60387            | 60450          | 60513 | 60576          | 60639             |       |
| 4   | 33724          | 33815          | 33905 | 33995          | 34085    | 34175  | 34  | 60764            | 60827          | 60890 | 60952          | 61015             | 610   |
| 5   | 34265          | 34355          | 34444 | 34534          | 34628    | 34713  | 35  | 61139            | 61202          | 61264 | 61326          | 61388             | 61    |
| 6   | 34802          | 34891          | 34980 | 35069          | 35158    | 35247  | 36  | 61512            | 61574          | 61636 | 61698          | 61760             | 61    |
| 7   | 35335          | 35424          | 35512 | 35601          | 35689    |        | 37  | 61883            | 61945          | 62006 | 62068          | 62129             | 62    |
| 8   | 35865          | 35953          | 36041 | 36128          | 36216    | 36303  | 38  | 62252            | 62313          | 62375 | 62436          | 62497             | 62    |
| 9   | 36391          | 36478          | 36565 | 36653          |          |        | 39  | 62619            | 62680          | 62741 | 62802          | 62923             | 62    |
|     | 4.36913        | 37000          | -     | 87173          | -        | 37346  | 40  | 4.62984          | 63045          | 63105 | 63166          | 63226             | 68    |
| 1   | 37432          | 37518          |       | 37690          |          | 37862  | 41  | 63347            | 63407          | 63468 | 63528          | 63588             | 15.53 |
| 2   | 37948          | 38033          |       | 38204          |          |        | 42  | 63708            | 63768          | 63828 | 63888          | 63948             |       |
| 3   | 38459          |                | 38629 | 38204          |          |        |     |                  |                |       | 64246          | 64306             |       |
| 4   |                | 38544          | 10000 |                |          |        | 43  | 64068            | 64127          | 64187 |                | 64662             |       |
| 5   | 38968          | 39052          | 39137 | 39221          | 39305    | 39389  | 44  | 64425            | 64484          | 64544 | 64603          | 65016             | 175.0 |
| - 1 | 39473          | 39557          | 39641 | 39725          |          | 39892  | 45  | 64780            | 64839          | 64898 | 64957          |                   | 100   |
| 0   | 39975          | 40058          |       | 40225          |          |        | 46  | 65134            | 65198          | 65251 | 65310          | 65369             | 65    |
| 7   | 40474          | 40556          | 40639 | 40722          |          | 40886  | 47  | 65486            | 65544          | 65602 | 65661          | 65719             |       |
| 8   | 40969          | 41051          | 41133 | 41215          |          | 41379  | 48  | 65836            | 65894          | 65952 | 66010          | 66068<br>66415    | 66    |
| -   | 41461          | 41542          |       |                | -        | 41868  | 49  |                  | 66241          | 66299 | and the last   |                   | _     |
|     | 4.41950        |                |       |                |          | 42355  | 50  | 4.66530          | 66588          | 66645 | 66702          | 66760             | 668   |
| I   |                |                | 42597 | 42677          |          | 42838  | 51  | 66874            | 66932          | 66989 | 67046          | 67103             | 67    |
| 2   | 42918          |                |       |                |          |        |     | 67217            | 67274          | 67331 | 67388          | 67445             | 673   |
| 3   |                |                | 49557 |                |          |        |     | 67558            | 67615          | 67671 | 67728          | 67785             | 678   |
| 4   | 43874          | 43953          | 44032 | 44111          | 44190    | 44269  | 54  | 67897            | 67954          | 68010 | 68066          | 68123             | 681   |
| 5   | 44348          | 44426          | 44505 | 44583          | 44662    | 44740  | 55  |                  | 68291          |       | 68403          | 68459             | 685   |
| 6   |                |                | 44974 |                |          |        |     | 68571            | 68627          | 68689 | 68738          | 68794             | 688   |
|     |                |                |       |                |          | 45678  |     | 68905            | 68960          | 69016 | 69071          | 69127             | 691   |
| 7   | 45286          | 20000          |       |                |          |        |     |                  |                |       |                |                   |       |
| 7 3 | 45750          | 45827          | 45904 | 45981          | 46058    | 46135  | 58  | 69237<br>4.69568 | 69999          | 69848 | 69403          | 69458             | 630   |

TABLE XXXVII.

|     |                |                   |                     |                | Ar              | gument         | . I  | USING.  |                |                |                |                |              |
|-----|----------------|-------------------|---------------------|----------------|-----------------|----------------|------|---------|----------------|----------------|----------------|----------------|--------------|
|     |                |                   | 4 Ho                |                |                 |                |      |         |                | 5 Ho           |                |                |              |
| M.  | 0"             | 10"               | 20"                 | 30"            | 40"             | 50"            | M.   | Ott     | 10"            | 20"            | 50"            | 40"            | 50//         |
| 0   | 4.69897        | 69952             | 70006               | 70061          | 70115           | 70170          | 0    | 4.86992 | 87034          | 87075          | 87116          | 87157          | 87198        |
| 1   | 70224          | 70279             | 70333               | 70387          | 70422           | 70496          | 1    | 87239   | 87280          | 87321          | 87362          | 87402          | 8744         |
| 2   | 70550          | 7,0604            | 70658               | 70712          | 7.0766          | 70820          | 2    |         | 87525          |                |                | 87647          | 8768         |
| S   | 70874          | 70928             | 70982               | 71036          | 71089           | 71143          | S    |         | 87769          |                |                | 87890          | 8793         |
| 4   | 71197          | 71250             |                     | 71357          | 71411           | 71464          | 4    |         | 88012          |                | 88093          | 88133          | 88173        |
| 5   | 71518          | 71571             | 71624               | 71678          | 71730           | 71784          | 5    |         | 88254          | 88294          | 88834          |                | 8841         |
| 6   | 71837          | 71890             | 100                 |                | 72049           | 72102          | 6    |         | 88494          | 88534          | 88574          | 88614          | 8865         |
| 7.  | 72155          | 72208             | 72260               | 72313          | 72366           | 72418          | 7    |         | 88734          | 88774          | 88814          | 88853          | 88893        |
| 8   | 72471          | 72523             | 72576               | 72628          | 72681           | 72783          | 8    |         | 88973          | 89012<br>89250 | 89052          | 89091<br>89328 | 8913<br>8936 |
| 9   | 72785          | 72838             | 72890               | 72942          | 72994           | 73046          | 9    | 89171   | 89210          | 09230          | 89289          |                | -            |
| 10  |                | 73150             |                     | 73254          |                 |                |      | 4 89407 | 89447          | 89486          | 89525          |                | 8960         |
| 17  | -73410         |                   | 73514               | 73565          |                 | 73668          | 11   | 89643   | 89682          | 89721          | 89760          | 89799          | 8983         |
| 12  | 73720          | 73772             | 73823               | 73874          |                 | 73977          | 12   |         | 89916          | 89955          | 89994          | 90033          | 90075        |
| 13  |                | 74080             |                     | 74182          | 74233           |                | 13   |         | 90149          |                | 90227          | 90266          | 9030         |
| 14  | 74835          | 74386             | 74437               | 74488          | 74539           | 74590          | 14   |         | 90382          | 90421          | 90459          | 90498<br>90728 | 90536        |
| 15  |                | 74692             |                     | 74793          | 74844           |                | 15   |         | 90613          | 90652<br>90882 | 90690<br>90920 |                | 90996        |
| 16  | 74945          | 74995             |                     | 75096          | 75147           | 75197          | 16   |         | 91073          | 91111          | 91149          | 91187          | 9122         |
| 17  | 75247          | 75298<br>75599    | 75848<br>75649      | 75398<br>75699 | 75448           | 75498<br>75798 | 17   |         | 91301          | 91339          | 91377          | 91415          | 9145         |
| 19  | 75548<br>75848 | 75898             | 75948               | 75997          | 7.5748<br>76047 | 76097          | 19   |         |                | 91566          |                | 91641          | 91679        |
| -   | -              |                   | -                   | -              |                 |                | -    |         |                |                |                | -              |              |
| 20  | 4.76146        | 76196             | 76245               | 76295          | 76344           | 76394          |      | 4.91716 | 91754          | 91792          | 91830          | 91867          | 91904        |
| 21  | 76443          | 76492             | 76542               | 76591          | 76640           |                | 21   | 91919   | 91979          | 92017          | 92054          | 92092<br>92315 | 92129        |
| 22  | 76738          | 76787             | 76836               | 7688.5         | 76934           | 76983          | 22   | 92166   | V              | 90241          | 92278          | 92538          | 92578        |
| 23  | 77032          | 77081             | 77150               | 77179          |                 | 77276          | 23   |         | 92427<br>92649 | 2              | 92501<br>92723 | 92760          | 92796        |
| 24  | 77325          | 77378<br>77664    | 77422               | 77470          | 77519<br>77809  | 77567<br>77837 | 25   |         | 92870          |                | 92944          | 92980          | 93017        |
| 25  | 77616          | 77954             |                     | 78050          |                 | 78146          | 26   |         | 93090          |                | 93164          | 93200          | 93231        |
| 27  | 78194          | 78242             | 1 1 1 1 1 1 1 1 1 1 | 78338          | 78385           |                | 27   | 93273   |                | 93346          | 93383          | 93419          | 93453        |
| 28  |                | 78529             | 78576               | 78624          | 78671           | 78719          | 23   |         | 93528          | 93564          | 93600          | 98637          | 93678        |
| 29  | 78767          | 78814             | 78861               | 78908          | 78956           | 79003          | 29   | 98709   | 93745          | 93781          | 93817          | 93854          | 93890        |
| 110 |                | -                 |                     |                |                 | -              | -    |         | -              |                | 01001          | 0.4000         | 04100        |
| 30  | 4.79051        | 79098             | 79145               | 79192          |                 | 79287          |      | 4.93926 | 93962          | 93998          | 94034          | 94069<br>94284 | 94103        |
| 31  | 79334          | 79381             | 79428               | 79475          | 79522           |                | 31   | 94141   | 94177<br>94392 | 94218<br>94427 | 94249<br>94468 | 94498          | 9453         |
| 32  | 79615          | 79662<br>79942    | 79709               | 79756          | 79802           | 79849<br>80128 | 32   |         | 94605          |                | 94676          | 94712          | 94747        |
| 33  | 79896<br>80175 |                   | 80267               | 80314          | 80082<br>80360  | 100            | 34   |         | 94818          | 94853          | 10000          | 94924          | 94959        |
| 35  |                | and the second    |                     | 80591          | 80637           | 80683          | 35   |         |                | 95065          |                | 95135          | 95170        |
| 36  |                | 80775             |                     | 80866          | 80912           | 80958          | 36   |         | 95940          | 2.00           |                | 95845          | 95380        |
| 37  |                | The second second |                     | 81141          | 81186           |                | 37   | 95415   | 95450          |                |                | 95555          | 95589        |
| 38  |                | 81323             | 81368               | 81414          | 81459           |                | 38   | 95624   | 95659          | 95694          | 95728          | 95763          | 95799        |
| 39  | 81550          | 81595             | 81641               | 81686          | 81731           | 81776          | 39   | 95832   | 95867          | 95902          | 95936          | 95971          | 96003        |
| 40  | 4.81821        | 81866             | 81911               | 81956          | 82001           | 82046          | 40   | 4.96040 | 96074          | 96109          | 96148          | 96177          | 96215        |
| 41  | 82091          | 82136             |                     | 82226          | 82271           | 82315          | 41   | 96246   | 96280          | 96315          |                | 96383          | 96417        |
| 42  | 82360          | No. of Contract   | 82449               |                | 82538           |                | 42   |         | 96486          | 96520          | 96554          | 96588          | 96625        |
| 48  | 82628          | 82672             | 82716               | 82761          | 82805           | 82850          | 43   |         | 96690          | 96724          | 96758          | 96792          | 96826        |
| 44  | 82894          | 82938             | 82982               | 83026          | 83071           | 83115          | 44   | 96860   | 96894          | 96927          | 96961          | 96995          | 97029        |
| 45  | 83159          | 83203             | 83247               | 83291          | 83335           | 83379          | 45   | 97062   | 97096          | 97130          | 97163          |                | 97231        |
| 46  | 89423          | 83467             | 83510               |                | 89598           | 83642          | 46   |         | 97298          | 97331          |                | 97398          | 97435        |
| 47  | 83685          |                   |                     |                |                 |                | 47   | 97465   | 97499          | 97532          | 97565          |                | 97632        |
| 48  | 83947          | 85990             |                     |                | 84120           | 84164          | 48   |         | 97699          | 97732          |                | 97798          | 97835        |
| 49  | 84207          | 84250             | 84293               | 84337          | 84380           | 84423          | 49   | 97865   | 97898          | 97931          | 97964          | 97997          | 98030        |
| 50  | 4.84466        | 84509             | 84552               | 84595          | 84638           | 84681          | 50   | 4.98063 |                |                |                |                |              |
| 51  | 84724          | 84767             | 84810               | 84852          | 84895           | 84988          | 51   | 98261   | 98293          | 98826          | 98859          | 98592          | 9842         |
| 52  |                |                   | 85066               |                |                 |                |      | 98457   | 98490          | 98523          | 98555          | 98588          | 98620        |
| 58  |                |                   | 85321               |                |                 |                |      |         |                |                | 987.51         |                |              |
| 54  | 85490          |                   |                     |                |                 |                |      |         |                |                | 98945          |                |              |
| 55  |                |                   | 85828               |                |                 |                |      |         | 99074          |                | 99139          |                |              |
| 56  | 85996          |                   |                     |                |                 |                |      |         | 99267          |                | 99332          |                |              |
| 57  |                |                   | 86330               |                |                 |                |      |         |                |                | 99524          |                |              |
| 58  | 86496          | 86538             | 86579               | 86621          | 89662           | 86704          | 58   | 99619   | 99651          | 99688          | 99715          | 99747          | 99778        |
| 59  | 4.86745        | 86786             | 86828               | 86869          | 86910           | 86951          | 1 59 | 4.99810 | 99842          | 99873          | 99905          | 99937          | 98308        |
|     |                |                   |                     |                |                 |                |      |         |                |                |                |                |              |

## TABLE XXXVII.

|                  |                |                         |                |                | Ar             | gument         | . F      | USING.         |                |                |                         |                  |                |
|------------------|----------------|-------------------------|----------------|----------------|----------------|----------------|----------|----------------|----------------|----------------|-------------------------|------------------|----------------|
|                  | l              |                         | 6 Ho           |                |                |                |          |                | <del></del>    | 7 Hc           | urs.                    |                  |                |
| M.               | 0"             | 10"                     | 20"            | 30"            | 40"            | 50″            | M.       | <i>''</i>      | 10"            | 20"            | 30"                     | 40"              | 50"            |
| 0                | 5.00000        | .00031                  | 00068          | 00094          | 00125          | 00156          | 0        | 5.09996        | 10020          | 10044          | 10068                   | 10092            | 10116          |
| 1                | 00188          | 00219                   | 00250          | 00282          | 00313          | 00345          | 1        | 10140          | 10164          | 10188          | 10212                   | 10236            | 10260          |
| 2                | 00876          | 00407                   | 00438          | 00469          | 00501          | 00532          | 2        | 10284          | 10308          | 10332          | 10356                   | 10380            | 10404          |
| 3                | 00563          | 00595                   |                | 00657          | 00689          |                | 3        | 10429          |                | 10477          | 10501                   | 10525            | 10549          |
| 4                | 00751          | 00782                   | 00818          | 00844          |                | 00905          | 4        | 10573          | 10596          | 10620          | - 1                     | 10667            | 10691          |
| 5                | 00936          | 00967                   | 00998          | 01028          |                | 01090          | 5<br>6   | 10714          | 10738          | 10761          | 10785                   | 10809            | 10832          |
| 6<br>7           | 01121<br>01305 | 01151<br>01336          | 01182<br>01367 | 01213<br>01398 | 01244<br>01428 |                | 7        | 10856<br>10997 | 10879<br>11021 | 10903<br>11044 | 10926                   | 10950            |                |
| 8                | 01303          |                         | 01550<br>01550 | 01580          |                | 01433          | 8        | 11139          | 11162          | 11183          | 11068<br>11208          | · 11092<br>11281 | 11115<br>11255 |
| 9                | 01671          | 01701                   | 01732          | 01762          | 01792          | 01822          | 9        | 11278          | 11301          | 11324          | 11347                   | 11370            |                |
| 10               | 5.01853        | 01883                   | 01913          | 01943          | 01973          | 02004          | 10       | 5.11417        | 11440          | 11463          | 11486                   | 11509            | 11532          |
| 11               | 02034          | 02064                   |                | 02125          | 02155          | 02185          | 11       | 11556          | 11579          | 11602          | 11625                   | 11648            |                |
| 12               | 02215          | 02245                   | 02275          | 02304          |                | 02364          | 12       | 11694          | 11717          | 11740          | 11763                   | 11785            |                |
| 13               | 02394          | 02423                   | 02453          | 02483          |                | 02542          | 13       | 11831          | 11854          | 11876          |                         | 11922            | 11945          |
| 14               | 02572          | 02602                   | 02631          | 02661          | 02691          | 02720          | 14       | 11967          | 11990          | 12013          | 12036                   | 12058            |                |
| 15               | 02750          | 02780                   | 02810          | 02839          |                | 02899          | 15       | 12104          |                | 12149          | 12172                   | 12195            |                |
| 16<br>17         | 02928<br>03104 | 02958<br>031 <b>3</b> 3 | 02987<br>03162 | 03016<br>03191 | 03045<br>03220 | 03074<br>03250 | 16<br>17 | 12240<br>12374 | 12263<br>12396 | 12285          | 12307                   | 12329            |                |
| 18               | 03104          | 03133                   | 03337          | 03366          | 03396          | 03425          | 18       | 12508          | 12530          | 12419<br>12553 | 12441<br>12575          | 12463<br>12597   | 12486<br>12619 |
| 19               | 03454          | 03383                   | 03512          | 03542          | 03571          | 03600          | 19       | 12642          | 12664          | 12686          |                         | 12597            | 12619          |
| 20               | 5.03629        | 03658                   | 03687          | 03715          | 03744          | 03773          | 20       | 5.12776        | 12798          | 12820          | 12841                   | 12863            | 12885          |
| 21               | 03801          | <b>0</b> 3830           |                | 03887          | 03916          | 03945          | 21       | 12907          | 12929          | 12951          | 12973                   | 12995            |                |
| 22               | 03974          | 04002                   |                | 04060          |                | 04117          | 22       | 13039          | 13061          | 13083          | 13104                   | 13126            | 13148          |
| 23               | 04146          | 04174                   | 04203          | 04232          | 04261          | 04289          | 23       | 13170          | 13192          |                | 13236                   | 13258            |                |
| 24               | 04318          | 04346                   | 04374          | 04402          | 04430          | 04459          | 24       | 13302          | 13323          | 18345          |                         | 13388            |                |
| 25<br>26         | 04487          | 04515<br>04684          | 04543<br>04712 | 04571          | 04600          |                | 25       | 13431<br>13560 | 13452          | 13474          |                         | 13517            | 13538          |
| 27               | 04656<br>04825 | Q4853                   | 04881          | 04740<br>04910 | 04769<br>04938 | 04797<br>04966 | 26<br>27 | 13689          | 13581<br>13711 | 13603<br>13732 | 13624                   | 13646            | 1 .            |
| 28               | 04994          | 05022                   | 05050          | 05077          | 05105          | Q5133          | 28       | 13818          | 13839          | 13860          | 137 <i>5</i> 3<br>13881 | 13775<br>13902   | 13923          |
| 29               | 05160          | 0.5188                  | 05216          | 05248          | 05271          | 05299          | 29       | 13944          | 13966          | 13987          | 14008                   |                  |                |
| 30               | 5.05327        | 05354                   | 05382          | 05410          | 05437          | 05465          | 30       | 5.14071        | 14092          | 14113          | 14134                   | 14155            | 14176          |
| 31               | 05493          | 05520                   |                | 05576          | 05604          | 05631          | ់ 31     | 14198          | 14219          | 14240          | 14261                   | 14282            | 14303          |
| 32               | 05659          |                         | 05713          |                | 05768          |                | 32       | 14324          | 14345          |                | 14386                   | 14407            |                |
| 33               | 05822          |                         | 05876          | 05904          |                | 05958          | 33       | 14449          |                | 14490          |                         | 14531            | 14552          |
| 34               | 05985          | 06013                   | 06040          | 06067          | 06094          | 06122          | 34       | 14573          | 14593          | 14614          | P4635                   | 14656            |                |
| 35<br>36         | 06149<br>06312 | 06176<br>06339          |                | 06230<br>06392 |                | 06285<br>06445 | 35<br>36 | 14697 $14821$  | 14718<br>14842 | 14738<br>14862 | 14759<br>14882          | 14780            |                |
| 37               | 06472          | 06499                   | 06526          | 06553          |                | 06606          | 37       | 14943          |                | 14984          | 15004                   | 14902<br>15024   |                |
| 38               | 06633          | 06601                   |                | 06713          | 06740          |                | 38       | 15065          | 15085          | 15106          | 15126                   | 15146            |                |
| 39               | 06793          |                         | 06847          | 06875          | 06900          | 06927          | 39       | 15187          | 15207          | 15227          | 15248                   | 15268            |                |
| 40               | 5.06954        |                         | 07006          | 07033          | 07059          | 07085          |          | 5.15309        | 15329          | 15349          | 15369                   | 15888            | 15408          |
| 41               | 07111          | 07138                   |                | 07190          |                | 07243          | 41       | 15428          | 15448          | 15468          | 15488                   | 1.5508           |                |
| 42               | 07269          | 07295                   |                | 07348          |                | 07400          | 42       | 15548          | 15568          | 15588          | 15608                   | 15628            |                |
| 43<br>44         | 07427<br>07584 | 07453                   | 07479          | 07505          |                | 07558<br>07713 | 43       | 15667          | 15687          | 15707          | 15727                   | 15747            |                |
| 45               | 07739          | 07765                   | -              | 07662<br>07816 |                | 07713          | 44       | 15787<br>15904 | 15807<br>15924 | 15826          | 15846                   | 15865            |                |
| 46               | 07739          | 07920                   |                | 07971          | 07997          | 08023          | 46       | 16022          | 16041          | 15943<br>16061 | 15963<br>16080          | 15983<br>16100   |                |
| 47               | 08049          |                         | 08100          | 08126          |                | 08178          | 47       | 16139          | 16158          | 16178          | 16197                   | 16217            |                |
| 48               | 03203          | 08229                   | 08254          | 08280          | 08305          | 08330          | 48       | 16256          | 16275          | 16295          | 16314                   | 16333            |                |
| 49               | 08356          | 08381                   | 08406          | 08432          | 08457          | 08482          | 49       | 16371          | 16390          | 16410          |                         |                  | l ' .=         |
|                  | 5.08508        |                         |                |                |                |                | 50       | 5.16486        | 16505          | 16525          | 16544                   | 16568            | 16582          |
| 51               | •08660         |                         |                |                |                | 03787          | 51       | 16601          | 16620          | 16640          | 16659                   | 16678            | 16697          |
| 52               |                | 08837                   |                |                |                | 08936          |          |                |                |                | 16773                   |                  |                |
| 50               |                | 08986                   |                |                |                | 09086          |          |                | 16848          |                |                         |                  |                |
| 5 <u>4</u><br>55 |                | 09136                   |                | 09185          |                |                |          |                | 16960          |                |                         |                  |                |
| 56               |                |                         |                | 09335<br>09483 |                |                |          | 17167          | 17078<br>17185 | 17004          | 17000                   | 17129            | 17050          |
| 57               |                |                         |                | 09629          |                |                |          | 17977          | 17296          | 17914          | 17222                   | 17961            | 17969          |
| 58               |                |                         |                | 09776          |                |                |          | 17388          | 17406          | 17495          | 17449                   | 17460            | 17480          |
|                  | 7.0985         | 09874                   | 09899          | 09923          | 09947          | 09972          | 59       | 5.17498        | 17517          | 17535          | 17554                   | 17572            | 17590          |
|                  |                |                         |                |                |                |                |          |                |                |                |                         |                  |                |

## TABLE XXXVIII.

| 58 99 98 97 96 95 93 92 91 90 89 88 87   | 1          | 1        |     |       |      | TITIOT | T   | 21.05 | CONT. T. T. | 07777 |     | <del></del> |      |
|--|------------|----------|-----|-------|------|--------|-----|-------|-------------|-------|-----|-------------|------|
| 1º   0   | Arg.       | J        |     |       |      |        |     |       |             |       |     |             |      |
| 2  | Lat.       | 10       | 20  | ) 5°  | 40   | .50    | 6°  | 70    | 80          | . 9°  | 100 | 110         | 120  |
| 2  | 10         |          | 100 | 1 000 | 201  | 101    | 500 | con   | 705         | 907   | 010 | 11014       | 1110 |
| S  |            |          |     |       | 301  |        |     |       |             |       | 910 | 457         |      |
| 4  |            |          |     |       |      |        |     |       |             | 328   |     |             |      |
| 5  |            |          | 33  |       |      | .67    |     |       |             |       |     |             |      |
| 6  |            |          |     |       |      | 25.    |     |       |             |       |     |             |      |
| 71   |            |          |     |       |      |        |     |       |             |       |     |             |      |
| 8  |            |          |     |       |      |        |     |       |             |       |     |             |      |
| 9  |            |          |     |       |      |        |     |       |             |       |     |             | 73   |
| 10   90   80   70   60   50   40   30   20   10   0   10   20  |            |          |     |       |      |        |     |       |             |       |     |             |      |
| 11   |            | 89       |     | 67    |      |        |     |       |             |       |     | 22          |      |
| 12   92   84   75   67   59   51   49   34   26   18   9   9   14   93   86   77   69   62   54   46   99   32   24   16   8   14   93   86   79   72   65   58   51   44   97   30   22   15   15   93   86   79   72   65   58   51   44   97   30   22   15   16   94   88   82   76   70   63   57   51   45   99   32   26   17   94   88   82   76   70   63   57   51   45   99   32   26   17   94   88   82   76   70   63   57   51   45   99   32   26   17   94   88   83   77   72   66   60   54   48   42   36   90   18   95   90   85   80   75   70   65   60   54   49   44   95   95   90   86   81   76   70   65   60   54   49   44   95   95   90   86   81   76   71   66   61   57   52   47   42   42   42   42   43   43   43   43   | 10         | 90       | 80  | √70   | 60 ` | 50     | 40  | 30    | 20          | 10    | 0   | 10          | 20   |
| 12   92   84   75   67   59   51   49   34   26   18   9   9   14   93   86   77   69   62   54   46   99   32   24   16   8   14   93   86   79   72   65   58   51   44   97   30   22   15   15   93   86   79   72   65   58   51   44   97   30   22   15   16   94   88   82   76   70   63   57   51   45   99   32   26   17   94   88   82   76   70   63   57   51   45   99   32   26   17   94   88   82   76   70   63   57   51   45   99   32   26   17   94   88   83   77   72   66   60   54   48   42   36   90   18   95   90   85   80   75   70   65   60   54   49   44   95   95   90   86   81   76   70   65   60   54   49   44   95   95   90   86   81   76   71   66   61   57   52   47   42   42   42   42   43   43   43   43   | l          | <u> </u> | 00  | F 0   |      |        | 40  |       |             | 7.0   |     |             |      |
| 13   |            |          |     |       |      |        |     |       |             |       |     |             | 9    |
| 14   |            |          |     | 75    | 67   |        |     | 43    |             |       |     |             | Ž    |
| 15   |            |          |     |       |      |        |     |       |             |       |     |             |      |
| 16   |            |          |     |       |      |        |     |       |             |       |     |             | 15   |
| 17   |            |          |     |       |      |        |     |       |             |       |     |             | 51   |
| 18   |            |          |     |       |      |        |     |       |             |       |     |             |      |
| 19   |            |          |     |       |      |        |     |       |             |       |     |             | 30   |
| 20   95   90   86   81   76   71   66   61   57   52   47   42   |            |          |     |       |      |        |     |       |             |       |     |             |      |
| 21         96         91         86         82         78         73         68         63         59         54         50         45           22         96         91         87         83         79         74         70         66         61         56         52         47           23         96         92         88         84         81         76         72         69         65         60         56         52         25         96         92         89         85         82         78         74         70         66         62         58         54         26         96         92         89         85         82         78         74         70         66         62         58         54         26         96         93         89         86         83         79         76         73         69         65         62         58         28         27         97         97         93         90         86         83         79         76         73         69         65         62         58         28         28         97         94         91         88         84 <th></th> <th>95</th> <th>90</th> <th>85</th> <th>80</th> <th></th> <th></th> <th>65</th> <th></th> <th></th> <th></th> <th></th> <th></th>  |            | 95       | 90  | 85    | 80   |        |     | 65    |             |       |     |             |      |
| 22         96         91         87         83         79         74         70         66         61         56         52         47           23         96         92         88         84         81         76         71         67         63         59         54         50           24         96         92         88         84         81         76         72         69         65         60         56         52         58         54         50         56         52         58         54         50         66         62         58         54         50         66         62         58         54         60         56         52         58         54         60         56         52         58         54         60         56         52         58         54         60         56         62         58         52         78         74         70         66         62         58         52         58         58         79         76         73         70         67         64         60         56         52         58         58         39         79         79         74 <th>20</th> <th>95</th> <th>90</th> <th>86</th> <th>81</th> <th>76</th> <th>71</th> <th>66</th> <th>61</th> <th>57</th> <th>52</th> <th>47</th> <th>42</th>  | 20         | 95       | 90  | 86    | 81   | 76     | 71  | 66    | 61          | 57    | 52  | 47          | 42   |
| 22         96         91         87         83         79         74         70         66         61         56         52         47           23         96         92         88         84         81         76         71         67         63         59         54         50           24         96         92         88         84         81         76         72         69         65         60         56         52         58         54         50         56         52         58         54         50         66         62         58         54         50         66         62         58         54         60         56         52         58         54         60         56         52         58         54         60         56         52         58         54         60         56         62         58         52         78         74         70         66         62         58         52         58         58         79         76         73         70         67         64         60         56         52         58         58         39         79         79         74 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>===</th> <th></th> <th>=</th> <th>7 2</th>   |            |          |     |       |      |        |     |       |             | ===   |     | =           | 7 2  |
| 23         96         92         88         84         80         75         71         67         63         59         54         50           24         96         92         88         84         81         76         72         69         65         60         56         59         54         50           25         96         92         89         85         82         78         74         70         66         62         58         54           26         96         93         89         86         83         79         75         72         68         64         60         56           27         97         93         90         86         83         79         75         72         68         64         60         56           29         97         94         91         88         84         81         78         75         72         69         66         62         58           31         97         94         91         88         85         83         79         77         74         71         68         62           31   |            |          |     |       |      |        |     |       |             |       |     |             |      |
| 24         96         92         88         84         81         76         72         69         65         60         56         52         58         54         25         96         92         89         85         82         78         74         70         66         62         58         54         26         96         93         89         88         83         79         76         73         69         65         62         58         54         81         79         76         73         69         65         62         58         84         81         77         74         70         67         64         60         29         97         94         91         88         84         81         78         75         72         69         66         62         58         30         97         94         91         88         85         83         79         77         74         71         68         65         33         97         94         92         89         86         83         80         78         77         74         71         68         65         32         93         90<   |            |          |     |       |      |        |     | 70    |             |       |     |             |      |
| 25         96         92         89         85         82         75         74         70         66         62         58         54           26         96         93         89         86         83         79         75         72         68         64         60         56           27         97         93         90         87         84         80         77         74         70         67         64         60           29         97         94         91         88         84         81         78         75         72         69         66         62           30         97         94         91         88         85         82         79         77         74         70         67         64         60           31         97         94         91         88         85         83         79         77         74         71         68         65           32         97         94         92         89         86         83         80         78         75         72         69         66           33         97         95   |            |          |     |       |      |        |     |       |             |       |     |             | 50   |
| 26         96         93         89         86         88         79         75         72         68         64         60         56           27         97         93         90         86         83         79         76         73         69         65         62         58           28         97         93         90         88         84         81         78         75         72         69         66         62         30         97         94         91         88         84         81         78         75         72         69         66         62           311         97         94         91         88         85         83         79         77         74         71         68         65           322         97         94         92         89         86         83         80         78         75         72         69         66           332         97         94         92         89         86         83         80         78         75         72         69         66           332         97         94         92         88 <th></th> <th>52</th>  |            |          |     |       |      |        |     |       |             |       |     |             | 52   |
| 27    97    93    90    86    83    79    76    73    69    65    62    58      28    97    93    90    87    84    80    77    74    70    67    64    60      29    97    94    91    88    84    81    78    75    72    69    66    62      30    97    94    91    88    85    83    79    76    73    70    67    63      31    97    94    91    88    85    83    80    78    75    72    69    66      32    97    94    92    89    86    83    80    78    75    72    69    66      32    97    94    92    89    86    83    80    78    75    72    69    66      33    97    95    92    89    87    84    81    79    76    73    70    67      34    97    95    92    89    87    84    82    79    77    74    71    68      35    98    95    93    90    88    85    83    80    77    75    72    70      36    98    95    93    90    88    86    83    80    77    75    72    70      36    98    95    93    90    88    86    83    81    78    76    73    71      37    98    95    93    90    88    86    83    81    78    76    73    71      38    98    96    93    91    89    87    84    82    79    77    74    72      38    98    96    94    91    89    87    84    83    80    78    75    73      41    98    96    94    92    90    87    85    83    81    79    77    74      41    98    96    94    92    90    88    86    84    82    80    78    75    73      41    98    96    94    92    90    88    86    84    82    80    78    76    74      44    98    96    94    92    90    88    86    84    82    80    78    76    74      44    98    96    94    92    90    88    86    84    82    80    78    75    74      44    98    96    94    92    90    88    86    84    82    80    78    75    75      45    98    97    95    93    91    89    87    85    84    82    80    78    75    75      46    98    97    95    93    91    89    87    85    84    82    80    78    75    75      47    99    97    95    93    92    90    89    87    85    84    82    80    78    75    75      47    99    97    96    95    93    92    90    89 |            |          |     |       |      |        |     |       |             |       |     |             | 54   |
| 28    97    93    90    87    84    80    77    74    70    67    64    60   |            |          |     |       |      |        |     | 75    |             |       |     |             |      |
| 29    97    94    91    88    84    81    78    75    72    69    66    62   |            | 97       |     |       | 86   |        |     |       | 73          |       |     |             |      |
| 30         97         94         91         88         85         82         79         76         73         70         67         63           31         97         94         91         88         85         83         79         77         74         71         68         65           32         97         94         92         89         86         83         80         78         75         72         69         66         33         97         95         92         89         86         83         80         78         75         72         69         66         63         38         97         95         92         89         87         84         82         79         76         73         70         67         34         97         95         92         90         88         85         83         80         77         74         71         68         35         98         95         93         90         88         86         83         81         78         76         73         71         68         93         91         88         86         84         82         79 <th></th> <th>97</th> <th></th> <th></th> <th>87</th> <th>84</th> <th></th> <th></th> <th></th> <th>70</th> <th></th> <th></th> <th></th>  |            | 97       |     |       | 87   | 84     |     |       |             | 70    |     |             |      |
| 31         97         94         91         88         85         83         79         77         74         71         68         65           32         97         94         92         89         86         83         80         78         75         72         69         66           33         97         95         92         89         87         84         81         79         76         73         70         67           34         97         95         92         90         87         84         81         79         77         74         71         68           35         98         95         93         90         88         85         89         80         77         75         72         70           36         98         95         93         90         88         86         83         81         78         76         73         71         74         72         38         98         96         93         91         89         87         84         82         80         78         75         73         73         44         99         96   |            | 97       | 94  | 91    | 88   | 84     | 81  | 78    |             | ′ 72  | 69  |             |      |
| 32         97         94         92         89         86         83         80         78         75         72         69         66           33         97         95         92         89         87         84         81         79         76         73         70         67         73         70         67         73         70         67         73         70         67         74         71         68         35         98         95         93         90         88         86         83         80         77         74         71         60         73         71         73         73         79         98         95         93         90         88         86         83         81         78         76         73         71         73         73         98         95         93         91         88         86         83         81         78         76         73         71         73         73         79         77         74         72         73         39         98         96         94         91         89         87         85         83         81         79         77 </th <th>30</th> <th>97</th> <th>94</th> <th>91</th> <th>88</th> <th>85</th> <th>82</th> <th>79</th> <th>76</th> <th>73</th> <th>70</th> <th>67</th> <th>69</th>  | 30         | 97       | 94  | 91    | 88   | 85     | 82  | 79    | 76          | 73    | 70  | 67          | 69   |
| 32         97         94         92         89         86         83         80         78         75         72         69         66           33         97         95         92         89         87         84         81         79         76         73         70         67         73         70         67         73         70         67         73         70         67         74         71         68         35         98         95         93         90         88         86         83         80         77         74         71         60         73         71         73         73         79         98         95         93         90         88         86         83         81         78         76         73         71         73         73         98         95         93         91         88         86         83         81         78         76         73         71         73         73         79         77         74         72         73         39         98         96         94         91         89         87         85         83         81         79         77 </th <th>01</th> <th></th> <th></th> <th>01</th> <th></th> <th></th> <th></th> <th>70</th> <th>77</th> <th>74</th> <th>77</th> <th>69</th> <th>65</th>  | 01         |          |     | 01    |      |        |     | 70    | 77          | 74    | 77  | 69          | 65   |
| 33         97         95         92         89         87         84         81         79         76         73         70         67           34         97         95         92         90         87         84         82         79         77         74         71         68           35         98         95         93         90         88         85         83         80         77         75         72         70           36         98         95         93         90         88         86         83         81         78         76         73         71           37         98         95         93         91         88         86         84         82         79         77         74         72         38         98         96         94         91         89         87         84         83         81         78         76         73         77         74         72         38         96         94         92         90         88         86         84         82         80         78         75         73         75         74         40         98  |            |          |     |       |      |        |     |       |             |       |     |             | 86   |
| 35   |            |          |     |       |      |        |     |       |             |       |     |             | 65   |
| 35   |            |          |     |       |      |        |     |       |             |       |     |             | 60   |
| 37         98         95         93         91         88         86*         84         82         79         77         74         72         38         98         96         93         91         89         87         84         83         80         78         75         73         39         99         87         85         83         81         78         76         74         40         98         96         94         92         90         87         85         83         81         79         77         74         41         98         96         94         92         90         88         86         84         82         80         78         75         74         42         98         96         94         92         90         88         86         84         82         80         78         75         44         98         96         94         92         91         89         87         85         83         81         79         77         74         44         98         96         95         93         91         89         87         85         84         81         79         77   |            |          |     |       |      |        |     |       |             |       |     |             | 70   |
| 37         98         95         93         91         88         86*         84         82         79         77         74         72         38         98         96         93         91         89         87         84         83         80         78         75         73         39         99         87         85         83         81         78         76         74         40         98         96         94         92         90         87         85         83         81         79         77         74         41         98         96         94         92         90         88         86         84         82         80         78         75         74         42         98         96         94         92         90         88         86         84         82         80         78         75         44         98         96         94         92         91         89         87         85         83         81         79         77         74         44         98         96         95         93         91         89         87         85         84         81         79         77   |            |          |     |       |      |        |     |       |             | 70    |     | 70          | 70   |
| 38         98         96         93         91         89         87         84         83         80         78         75         73           39         98         96         94         91         89         87         85         83         81         79         77         74           41         98         96         94         92         90         88         86         84         82         80         78         75         74           41         98         96         94         92         90         88         86         84         82         80         78         75         74           42         96         94         92         90         88         86         84         82         80         78         75         74           43         98         96         94         92         91         89         87         85         83         81         79         77         74         44         98         96         95         93         91         89         87         85         84         82         80         78         46         98         97   |            |          |     |       |      |        |     |       |             |       |     |             | (4   |
| 39         98         96         94         91         89         87         85         83         81         78         76         74           40         98         96         94         92         90         87         85         83         81         79         77         74           41         98         96         94         92         90         88         86         84         82         80         78         75         74           42         96         94         92         90         88         86         84         82         80         78         75           43         98         96         94         92         90         88         86         84         82         80         78         76           43         98         96         94         92         91         89         87         85         84         82         80         78         76         74           45         98         97         95         93         91         89         88         86         84         82         81         79         77           46   |            |          |     |       |      |        |     |       |             |       |     |             | 72   |
| 41         98         96         94         92         90         88         86         84         82         80         78         75           42         98         96         94         92         90         88         86         84         82         80         78         76           43         98         96         94         92         91         89         87         85         83         81         79         77           44         98         96         95         93         91         89         87         85         84         82         80         78         77         77         44         98         96         95         93         91         89         87         85         84         82         80         78         86         84         82         80         78         86         84         82         81         79         79         79         95         93         92         90         88         86         84         82         80         78         84         82         80         78         84         82         80         48         84         82 <th></th> <th>73</th>   |            |          |     |       |      |        |     |       |             |       |     |             | 73   |
| 41         98         96         94         92         90         88         86         84         82         80         78         75           42         98         96         94         92         90         88         86         84         82         80         78         76           43         98         96         94         92         91         89         87         85         83         81         79         77           44         98         96         95         93         91         89         87         85         84         82         80         78         77         77         44         98         96         95         93         91         89         87         85         84         82         80         78         86         84         82         80         78         86         84         82         81         79         79         79         95         93         92         90         88         86         84         82         80         78         84         82         80         78         84         82         80         48         84         82 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>87</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>74</th>   |            |          |     |       |      |        | 87  |       |             |       |     |             | 74   |
| 42         98         96         94         92         90         88         86         84         82         80         78         76           43         98         96         94         92         91         89         87         85         83         81         79         77           44         98         96         95         93         91         89         87         85         84         82         80         78         45         82         80         78         45         82         80         78         45         82         80         78         85         84         82         80         78         85         84         82         80         78         85         86         84         82         80         78         85         84         82         81         79         46         98         97         95         93         92         90         89         87         85         84         82         80         48         48         82         80         48         84         82         80         49         89         87         86         84         82         80 <th>40</th> <th>98</th> <th>96</th> <th>94</th> <th>92</th> <th>90</th> <th>87</th> <th>8.5</th> <th>83</th> <th>81</th> <th>_79</th> <th>77</th> <th></th>  | 40         | 98       | 96  | 94    | 92   | 90     | 87  | 8.5   | 83          | 81    | _79 | 77          |      |
| 42         98         96         94         92         90         88         86         84         82         80         78         76           43         98         96         94         92         91         89         87         85         83         81         79         77           44         98         96         95         93         91         89         87         85         84         82         80         78         45         82         80         78         45         82         80         78         45         82         80         78         85         84         82         80         78         85         84         82         80         78         85         86         84         82         80         78         85         84         82         81         79         46         98         97         95         93         92         90         89         87         85         84         82         80         48         48         82         80         48         84         82         80         49         89         87         86         84         82         80 <th>41</th> <th>98</th> <th>96</th> <th>94</th> <th>92</th> <th>90</th> <th>88</th> <th>86</th> <th>84</th> <th>82</th> <th>80</th> <th>78</th> <th>75</th>  | 41         | 98       | 96  | 94    | 92   | 90     | 88  | 86    | 84          | 82    | 80  | 78          | 75   |
| 45         96         94         92         91         89         87         85         81         79         77         44         98         96         95         93         91         89         87         85         84         82         80         78         78         78         85         84         82         81         79         76         78         45         98         97         95         93         91         89         88         86         84         82         81         79         47         99         97         95         93         92         90         89         87         85         84         82         81         79         47         99         97         95         93         92         90         89         87         85         84         82         80         48         48         82         80         48         48         82         80         48         48         82         80         48         48         82         80         48         84         82         80         48         86         85         83         81         50         90         90         90<   |            |          |     |       |      |        |     |       |             |       |     |             | 76   |
| 44         98         96         95         93         91         89         87         85         84         82         80         78           45         98         97         95         93         91         89         88         86         84         82         81         79           46         98         97         95         93         92         90         88         86         82         83         81         79           47         99         97         95         93         92         90         89         87         85         84         82         80           48         99         97         95         94         92         90         89         87         86         84         82         80           49         99         97         95         94         92         91         89         88         86         85         83         81           50         99         97         96         94         93         92         90         89         87         86         84         82           51         99         97         96   |            |          |     |       |      |        |     | 87    |             | 83    |     |             | 77   |
| 45         98         97         95         93         91         89         88         86         84         82         81         79           46         98         97         95         93         92         90         88         86         84         82         81         79           47         99         97         95         94         92         90         89         87         85         84         82         80           48         99         97         95         94         92         90         89         87         86         84         82         80           49         99         97         95         94         92         91         89         86         86         85         83         81           50         99         97         96         94         93         91         90         88         87         85         83         81           51         99         97         96         94         93         92         90         89         87         86         84         82           52         99         97         96   |            |          |     |       |      |        |     |       |             |       |     |             |      |
| 46     98     97     95     93     92     90     88     86     85     83     81     79       47     99     97     95     93     92     90     89     87     85     84     82     80       48     99     97     95     94     92     91     89     88     86     84     82     80       49     99     97     96     94     93     91     90     88     87     85     83     81       50     99     97     96     94     93     91     90     89     87     86     84     82       52     99     97     96     95     93     92     90     89     87     86     84     83       53     99     97     96     95     93     92     90     89     87     86     84     83       53     99     97     96     95     93     92     91     89     88     86     84     83       54     99     97     96     95     94     93     91     90     89     87     86     84       55     99 <th></th> <th>79</th>   |            |          |     |       |      |        |     |       |             |       |     |             | 79   |
| 47         99         97         95         93         92         90         89         87         85         84         82         80           48         99         97         95         94         92         90         89         87         86         84         82         80           49         99         97         96         94         92         91         89         88         86         85         83         81           50         99         97         96         94         93         91         90         89         87         86         84         82           51         99         97         96         94         93         92         90         89         87         86         84         82           52         99         97         96         95         93         92         90         89         88         86         84         82           53         99         97         96         95         93         92         91         89         88         86         84         82           54         99         97         96   | 46         |          |     |       |      |        |     |       |             | 85    |     |             | 79   |
| 48         99         97         95         94         92         90         89         87         86         84         82         80           49         99         97         95         94         92         91         89         88         86         85         83         81           50         99         97         96         94         93         92         90         89         87         86         84         82           51         99         97         96         94         93         92         90         89         87         86         84         82           52         99         97         96         95         93         92         90         89         88         86         84         82           53         99         97         96         95         93         92         91         89         88         87         85         83           54         99         97         96         95         94         92         91         90         89         87         86         84           55         99         98         96   |            |          |     |       |      |        |     |       |             |       |     |             | - 80 |
| 49         99         97         95         94         92         91         89         88         86         85         83         81           50         99         97         96         94         93         91         90         88         87         85         83         81           51         99         97         96         94         93         92         90         89         87         86         84         82           52         99         97         96         95         93         92         90         89         88         86         84         83           53         99         97         96         95         93         92         91         89         88         87         85         83           54         99         97         96         95         94         93         91         90         89         87         86         84           55         99         98         96         95         94         93         91         90         89         87         86         85           56         99         98         96   |            |          |     |       |      |        |     |       | 87          |       |     |             | 86   |
| 50         99         97         96         94         93         91         90         88         87         85         83         81           51         99         97         96         94         93         92         90         89         87         86         84         82           52         99         97         96         95         93         92         90         89         88         86         84         83           53         99         97         96         95         93         92         91         89         88         87         85         83           54         99         97         96         95         94         92         91         90         89         87         86         84         83           55         99         98         96         95         94         93         91         90         89         87         86         85           56         99         98         96         95         94         93         92         91         89         88         87         86           57         99         98   |            |          |     |       |      |        |     |       |             | 86    |     |             |      |
| 51         99         97         96         94         93         92         90         89         87         86         84         82           52         99         97         96         95         93         92         90         89         88         86         84         83           53         99         97         96         95         93         92         91         89         88         87         85         83           54         99         97         96         95         94         92         91         90         89         87         86         84           55         99         98         96         95         94         93         91         90         89         87         86         84           56         99         98         96         95         94         93         92         91         80         88         86         85           57         99         98         97         95         94         93         92         91         80         88         87         86           58         99         98         97   |            |          |     |       |      |        |     |       |             | 87    |     |             |      |
| 52     99     97     96     95     93     92     90     89     88     86     84     83       53     99     97     96     95     93     92     91     89     88     87     85     83       54     99     97     96     95     94     92     91     90     89     87     86     84       55     99     98     96     95     94     93     91     90     89     88     86     85       56     99     98     96     95     94     93     92     91     89     88     87     86       57     99     98     97     95     94     93     92     91     89     88     87     86       58     99     98     97     96     95     94     93     92     91     90     89     87     86       59     100     98     97     96     95     93     92     91     90     89     88     87       59     100     98     97     96     95     93     92     91     90     89     88     87       59 </th <th></th> <th>1</th> <th></th>   |            |          |     |       |      |        |     |       |             |       |     | 1           |      |
| 52     99     97     96     95     93     92     90     89     88     86     84     83       53     99     97     96     95     93     92     91     89     88     87     85     83       54     99     97     96     95     94     92     91     90     89     87     86     84       55     99     98     96     95     94     93     91     90     89     88     86     85       56     99     98     96     95     94     93     92     91     89     88     87     86       57     99     98     97     95     94     93     92     91     89     88     87     86       58     99     98     97     96     95     94     93     92     91     90     89     87     86       59     100     98     97     96     95     93     92     91     90     89     88     87       59     100     98     97     96     95     93     92     91     90     89     88     87       59 </th <th><i>5</i>1</th> <th>99</th> <th></th> <th>96</th> <th>94</th> <th>93</th> <th>92</th> <th>90</th> <th>89</th> <th>87</th> <th>86</th> <th>84</th> <th>82</th>   | <i>5</i> 1 | 99       |     | 96    | 94   | 93     | 92  | 90    | 89          | 87    | 86  | 84          | 82   |
| 55         99         97         96         95         93         92         91         89         88         87         85         83           54         99         97         96         95         94         92         91         90         89         87         86         84           55         99         98         96         95         94         93         91         90         89         88         86         85           56         99         98         96         95         94         93         92         91         80         88         87         86           57         99         98         97         96         95         94         93         92         91         90         89         87         86           58         99         98         97         96         95         93         92         91         90         89         87         86           59         100         98         97         96         95         93         92         91         90         89         88         87           59         100         98   | 52         | 99       | 97  | 96    | 95   | 93     | 92  | 90    | 89          | 88    | 86  | 1           | 83   |
| 54         99         97         96         95         94         92         91         90         89         87         86         84           55         99         98         96         95         94         93         91         90         89         88         86         85           56         99         98         96         95         94         93         92         91         80         88         87         86           57         99         98         97         96         95         94         93         92         91         90         89         87         86           58         99         98         97         96         95         93         92         91         90         89         87         86           59         100         98         97         96         95         93         92         91         90         89         88         87           59         100         98         97         96         95         93         92         91         89         88         87           59         100         100         100 <th></th> <th></th> <th></th> <th></th> <th>95</th> <th>93</th> <th>92</th> <th></th> <th>89</th> <th></th> <th></th> <th>85</th> <th></th>  |            |          |     |       | 95   | 93     | 92  |       | 89          |       |     | 85          |      |
| 55         99         98         96         95         94         93         91         90         89         88         86         85           56         99         98         96         95         94         93         92         91         89         88         87         86           57         99         98         97         95         94         93         92         91         90         89         87         86           58         99         98         97         96         95         93         92         91         90         89         88         87           59         100         98         97         96         95         94         93         92         91         89         88         87           59         100         98         97         96         95         94         93         92         91         89         88         87  |            | 99       | 97  | 96 -  |      | 94     | 92  | 91    | 90          | 89    |     | 86          | 84   |
| 56     99     98     96     95     94     93     92     91     89     88     87     86       57     99     98     97     95     94     93     92     91     90     89     87     86       58     99     98     97     96     95     93     92     91     90     89     87     86       59     100     98     97     96     95     94     93     92     91     89     88     87       59     100     98     97     96     95     94     93     92     91     89     88     87   | 55 1       |          |     |       |      |        |     |       |             |       |     |             |      |
| 57         99         98         97         95         94         93         92         91         90         89         87         86           58         99         98         97         96         95         93         92         91         90         89         88         87           59         100         98         97         96         95         94         93         92         91         89         88         87           59         100         98         97         96         95         94         93         92         91         89         88         87  |            |          |     |       |      |        |     |       |             |       |     |             |      |
| 58 99 98 97 96 95 93 92 91 90 89 88 87<br>59 100 98 97 96 95 94 93 92 91 89 88 87  |            |          |     |       |      |        |     |       |             |       |     |             | 86   |
| 59 100 98 97 96 95 94 93 92 91 89 88 87  |            |          |     |       |      |        |     |       |             |       |     |             |      |
|  |            | 100      |     |       |      |        |     |       |             |       |     |             | 87   |
|  |            | 100 '    |     |       |      |        |     |       |             |       |     |             |      |
|  |            |          |     |       |      |        |     | -     |             |       |     |             |      |

## TABLE XXXVIII.

| PART I. | The Latitude | and Declination | being of the | same Name. |
|---------|--------------|-----------------|--------------|------------|
|---------|--------------|-----------------|--------------|------------|

| 180   | ing.      |          |          | Argu | ment. |            |            | N OF |     |     |     |      |      |
|---|-----------|----------|----------|------|-------|------------|------------|------|-----|-----|-----|------|------|
| 2 561 614 667 721 775 880 886 942 999 1057 1115 1145 42 300 257 283 310 837 865 892 429 449 478 507 592 5164 1185 206 228 249 271 294 316 339 862 884 304 314 78 881 81 80 71 81 81 81 81 81 81 81 81 81 81 81 81 81  | at.       | 130      | 140      |      |       |            |            |      |     |     | 220 | 230  | 2310 |
| 8         941         376         411         447         483         550         557         594         639         461         170         780           5         164         185         206         228         949         271         294         416         339         362         385         397           6         119         137         155         173         191         100         298         246         265         284         304         317           8         103         118         133         149         165         180         196         213         229         246         234           10         31         42         55         63         73         84         95         106         118         129         141         147           10         31         42         55         63         73         84         95         106         118         129         141         147           10         31         42         55         63         73         84         95         106         118         129         146         141         141         147         26  |           |          |          |      |       | 1652       |            |      |     |     |     | 2332 | 2391 |
| 5         164         185         206         228         249         271         294         316         339         862         385         397           6         119         137         155         173         118         135         149         165         180         196         213         229         246         254         304         214         215         180         195         117         181         145         159         173         187         292         229         246         254         294         245         254         295         209         209         209         209         209         209         209         100         118         123         118         147         298         108         118         143         141         147           11         19         28         38         48         56         67         77         87         98         108         118         143           12         9         18         26         55         44         53         62         71         80         90         100         105         16         118         123         118 <t< td=""><td>2</td><td></td><td></td><td></td><td>721</td><td></td><td>830</td><td></td><td></td><td></td><td></td><td></td><td>1145</td></t<>  | 2         |          |          |      | 721   |            | 830        |      |     |     |     |      | 1145 |
| 5         164         185         206         228         249         271         294         316         339         862         385         397           6         119         137         155         173         118         135         149         165         180         196         213         229         246         254         304         214         215         180         195         117         181         145         159         173         187         292         229         246         254         294         245         254         295         209         209         209         209         209         209         209         100         118         123         118         147         298         108         118         143         141         147           11         19         28         38         48         56         67         77         87         98         108         118         143           12         9         18         26         55         44         53         62         71         80         90         100         105         16         118         123         118 <t< td=""><td>4</td><td></td><td></td><td>989</td><td>910</td><td>937</td><td>965</td><td>307</td><td></td><td></td><td></td><td></td><td>522</td></t<>  | 4         |          |          | 989  | 910   | 937        | 965        | 307  |     |     |     |      | 522  |
| 6 119 137 155 173 191 200 228 246 265 284 246 246 285 284 284 284 88 47 78 81 103 118 133 149 1655 180 196 213 229 246 246 246 246 246 246 246 246 246 246  | 5         | 164      |          | 206  | 228   | 249        |            |      |     |     | 362 | 385  | 397  |
| 8 64 77 91 104 117 131 145 159 173 187 292 209 9 46 57 69 81 93 105 117 129 149 145 168 174 10 31 42 55 63 73 84 95 106 118 129 141 147 11 19 28 58 48 58 67 77 87 87 98 108 118 129 141 147 11 19 28 58 48 58 55 44 53 62 71 80 90 100 105 13 0 8 16 24 33 41 49 57 66 74 84 88 14 7 0 7 15 23 90 38 46 54 62 70 74 15 15 14 7 0 6 14 21 28 36 43 51 59 62 16 19 13 6 0 6 14 21 28 36 43 51 59 62 16 19 13 6 0 6 13 20 27 34 41 48 53 17 20 27 34 41 48 59 17 25 19 19 7 0 6 12 18 26 32 38 42 18 29 24 17 12 6 0 6 12 18 26 32 38 42 19 38 38 28 29 17 11 6 0 6 6 12 19 24 30 34 19 38 38 88 29 21 16 11 5 0 6 12 19 24 30 34 19 38 38 38 34 29 25 10 11 5 10 5 0 6 11 16 20 21 24 43 38 34 38 34 29 25 19 15 10 5 0 5 10 13 22 43 38 38 34 29 25 19 15 10 5 0 5 0 5 10 13 22 43 38 38 34 29 22 31 19 14 10 5 0 0 5 17 22 44 9 44 40 36 32 27 23 18 14 9 5 0 0 5 17 22 49 49 44 40 36 32 27 23 18 14 9 5 0 0 5 17 22 5 17 25 19 19 7 0 6 6 13 19 14 10 5 0 0 5 17 22 5 19 12 7 0 6 14 3 39 34 30 26 22 17 13 11 28 56 53 49 45 42 37 33 30 26 22 17 13 11 28 57 55 51 47 43 39 34 30 26 22 18 13 9 9 7 23 18 14 9 5 0 0 5 17 22 5 19 10 5 0 0 5 17 22 5 19 10 5 0 0 5 17 22 5 19 10 5 0 0 5 17 22 5 19 10 5 0 0 5 17 22 5 19 10 5 0 0 5 17 22 5 19 10 5 0 0 5 17 22 5 19 10 5 0 0 5 17 22 5 19 10 5 0 0 5 17 22 5 19 10 10 10 5 0 5 17 22 5 19 10 10 10 10 10 10 10 10 10 10 10 10 10   | 6         |          | 137      | 155  | 173   | 191        | 209        | 228  |     | 265 |     |      | 314  |
| 9 46 57 69 81 93 105 117 129 142 185 168 174 10 31 42 55 63 73 84 95 106 118 129 141 147 11 19 28 88 48 58 67 77 87 87 98 108 118 123 112 9 18 26 35 44 53 62 71 80 90 100 105 13 0 8 16 24 33 41 49 57 66 74 84 84 88 11 47 7 0 7 15 23 30 38 44 54 62 70 74 15 14 7 0 0 6 14 21 28 36 43 51 50 62 17 15 14 7 0 0 6 14 21 28 36 43 51 50 62 17 15 14 7 0 0 6 14 21 28 36 43 51 50 62 17 18 19 13 6 0 6 13 20 27 34 41 48 52 17 25 19 19 7 0 6 12 18 26 32 38 42 17 12 6 0 6 12 18 26 32 38 42 18 29 24 17 12 6 0 6 12 19 24 30 34 19 33 28 22 17 11 6 0 6 12 19 24 30 34 19 33 28 22 17 11 6 0 6 12 19 24 30 34 19 33 28 38 34 29 25 19 15 10 5 0 5 10 13 22 40 35 38 38 39 25 21 16 11 5 0 5 0 5 10 13 22 44 38 38 34 29 25 19 15 10 5 0 5 7 23 40 44 40 36 32 27 27 23 18 14 9 5 0 25 12 49 44 40 36 32 27 27 23 18 14 9 5 0 25 51 47 43 39 34 50 26 22 18 13 9 7 26 55 51 47 43 39 34 50 26 22 18 13 9 7 26 55 51 47 43 39 34 50 26 22 18 13 9 7 26 55 51 47 44 40 36 32 27 23 18 14 9 5 5 0 25 50 50 57 54 55 40 44 51 38 34 31 27 24 21 30 59 57 54 50 46 43 39 36 32 29 25 21 7 13 11 27 25 26 53 49 45 42 37 33 39 36 32 28 28 24 21 17 15 28 57 53 50 46 43 39 36 32 29 25 21 17 13 11 27 55 51 47 44 40 36 33 39 34 30 26 22 17 13 11 27 24 21 30 59 57 54 50 47 43 40 37 34 30 27 25 33 36 46 62 59 56 53 50 47 44 41 38 34 31 27 24 21 38 32 66 66 63 60 57 54 51 48 45 42 39 35 32 30 33 64 62 59 56 63 60 57 54 51 48 45 42 39 35 32 30 33 64 62 59 56 63 60 57 54 51 48 45 42 39 35 32 30 33 64 62 59 56 63 60 60 58 55 52 49 46 43 40 36 33 30 28 33 64 62 59 56 63 60 57 54 51 48 45 42 39 35 32 30 33 64 62 59 56 63 60 60 57 54 51 48 45 42 39 35 32 30 33 64 62 59 56 63 60 60 57 54 51 48 45 42 39 35 32 30 33 64 62 59 56 63 60 60 57 54 51 48 45 42 39 35 32 30 33 64 62 59 56 63 60 60 60 57 54 51 48 45 42 39 35 32 30 33 64 62 59 56 63 60 60 60 60 60 60 60 60 60 60 60 60 60  | 7         |          |          | 118  | 133   | 149        | 165        |      | 196 |     |     |      | 254  |
| 10  |           |          | 77<br>57 |      |       | 117        | 131        |      | 129 | 173 |     |      |      |
| 12 9 18 26 S5 44 58 62 71 80 90 100 100 101 11  |           |          |          |      |       |            |            |      | 106 |     |     |      | 147  |
| 12         9         18         26         35         44         59         62         71         80         90         100         100         101         118         88         14         7         0         7         15         23         90         38         46         54         62         70         74         15         18         28         36         43         55         62         70         74         15         18         29         24         17         12         6         0         6         12         18         26         32         38         43         51         19         24         30         34         19         38         28         22         17         11         6         0         6         12         19         24         30         34         19         33         28         22         17         11         6         0         6         12         17         23         30         33         19         14         10         5         0         5         10         15         30         30         29         225         19         15         10         5   | 11        | . 19     | 28       | 38   | 48    | 58         | 67         | 77   | 87  | 98  | 108 | 118  | 123  |
| 14-7         7         0         7         15         28         50         38         46         54         62         70         74           15-16         19         13         6         0         6         13         20         27         34         41         48         52           17-25         19         19-7         0         6         12         18         26         32         38         48           18         29         24         17         12         6         0         6         12         19         24         30         34           19         33         28         22         17         11         6         0         6         12         19         24         30         34           19         33         28         22         11         16         11         5         0         6         11         16         10         5         0         5         10         15         0         5         10         15         20         25         10         15         0         6         11         16         0         0         11         16 </td <td></td> <td></td> <td>18</td> <td>26</td> <td></td> <td>44</td> <td>58</td> <td>62</td> <td>71</td> <td>80</td> <td>90</td> <td></td> <td>105</td>   |           |          | 18       | 26   |       | 44         | 58         | 62   | 71  | 80  | 90  |      | 105  |
| 15         14         7         0         6         14         21         28         86         43         5b         59         65         12         11         13         6         0         6         12         18         26         32         38         42         18         29         24         17         12         6         0         6         12         19         24         30         38         42         19         38         28         22         17         11         6         0         6         12         17         23         36           30         37         32         26         21         16         11         5         0         6         11         16         90         6         11         16         90         6         11         16         90         6         11         16         90         6         11         16         90         6         11         16         90         6         11         16         90         6         11         16         90         90         90         90         90         90         90         90         90         90 <td>13</td> <td></td> <td></td> <td></td> <td>24</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>74</td>   | 13        |          |          |      | 24    |            |            |      |     |     |     |      | 74   |
| 16         19         13         6         0         6         13         20         27         34         41         48         52           18         29         24         17         12         6         0         6         12         18         26         32         38         42           19         33         28         22         17         11         6         0         6         12         17         23         36           20         37         32         26         21         16         11         5         0         6         11         16         11         5         0         6         11         16         0         6         11         16         0         6         11         16         0         6         11         16         0         6         11         16         0         6         11         16         0         6         11         16         0         6         11         16         0         6         11         16         0         6         11         16         0         0         0         0         0         0         0 <td>15</td> <td></td> <td></td> <td></td> <td></td> <td>14</td> <td></td> <td></td> <td></td> <td></td> <td>5k</td> <td></td> <td></td>  | 15        |          |          |      |       | 14         |            |      |     |     | 5k  |      |      |
| 17  |           |          |          |      |       |            |            |      |     |     |     |      | 52   |
| 19  | 17        |          |          | 12   | 7     | 0          | 6          | 12   | 18  |     |     |      |      |
| 20 37 32 26 21 16 11 5 0 6 11 16 20  21 40 35 30 25 20 15 10 5 0 5 10 13  22 45 38 34 29 25 19 15 10 5 0 5 7  23 46 41 37 33 29 23 19 14 10 5 0 2  24 49 44 40 36 32 27 23 18 14 9 5 0  25 51 47 43 39 84 30 26 22 118 13 9 7  26 53 49 45 42 37 33 30 26 22 17 13 11  27 55 51 47 44 40 36 33 29 25 21 17 15  28 57 53 50 46 43 39 36 32 27 23 18 11 3 9 7  28 57 53 50 46 43 39 36 32 27 23 18 17 17 13 11  27 55 55 51 47 44 40 36 38 29 25 21 17 15  28 57 53 50 46 43 39 36 32 28 24 21 18  29 58 55 52 48 45 41 38 94 31 27 24 21  30 59 57 54 50 47 43 40 37 34 30 27 35  31 61 58 55 52 49 46 43 40 37 34 30 27 35  31 61 61 58 55 52 49 46 43 40 37 34 30 27 35  32 63 60 57 54 51 48 45 42 39 35 30 36  33 64 62 59 56 53 50 47 44 41 38 34 30 37 34 30 27  35 36 64 62 59 56 53 50 47 44 41 38 35 35 32  36 66 67 64 62 59 56 53 50 47 44 41 38 35 35 32  36 68 66 63 60 58 55 52 49 46 43 40 37 36 33 30 28  35 64 662 59 56 53 50 47 44 41 38 35 35 32  36 66 67 64 62 59 56 53 50 47 44 41 38 39 35 32  38 64 662 59 56 53 50 47 44 41 38 39 35 32 30  38 64 662 67 64 62 59 56 53 50 47 44 41 38 39 35 32  38 71 68 66 63 61 58 55 52 49 46 43 40 37 36  40 73 70 68 66 63 61 58 55 53 50 47 44 42 49  37 70 68 66 63 61 58 55 53 51 48 46 44  38 71 68 66 63 61 58 55 53 50 47 44 42 40  38 71 68 66 63 61 58 55 53 50 47 44 42 40  38 71 69 67 64 62 59 56 63 60 57 55 53 50 48 46  40 73 70 68 66 63 61 58 56 53 51 48 46 44  40 73 70 68 66 63 61 58 56 53 51 48 46 44  41 73 71 69 67 65 62 60 57 55 53 50 48 46  40 73 70 68 66 64 62 60 57 55 55 53 50 48 46  41 73 71 69 67 65 63 60 58 56 55 50 50 51 57 55 50 50 50 50 50 50 50 50 50 50 50 50   | 18        |          |          |      |       |            |            |      | 12  | 19  | 24  | -30  |      |
| 21  | 19<br>20  |          |          |      |       |            |            |      |     |     | 17  | 16   |      |
| 92         45         38         34         29         25         19         15         10         5         0         5         7           23         46         41         37         33         29         23         19         14         10         5         0         2           24         49         44         40         36         32         27         23         18         14         9         5         0           25         51         47         43         39         84         30         26         22         18         13         9         7           26         53         49         45         42         37         33         30         26         22         17         13         11           27         55         51         47         44         40         36         33         29         25         21         17         15           28         55         53         50         46         43         39         36         32         28         24         21         18           29         58         55         52         49   |           | 40       |          |      |       |            |            |      | 5   | 0   |     | 10   |      |
| 24         49         44         40         36         32         27         23         18         14         9         5         0           25         51         47         43         39         84         30         26         22         18         13         9         7           26         53         49         45         42         37         38         30         26         22         17         13         11           27         55         51         47         44         40         36         33         29         25         21         17         15           28         57         53         50         46         43         39         36         32         28         24         21         18           30         59         57         54         50         47         43         40         36         33         30         22           31         61         58         55         52         49         46         43         40         36         33         30         28           32         63         60         57         54   | 22        | 45       | 38       | 34   | 29    | . 25       | 19         | 15   | 10  | 5   | 0   | 5    |      |
| 25 51 47 43 39 84 30 26 22 18 13 9 7 7 26 65 63 61 59 57 54 51 48 46 44 39 7 36 66 64 62 60 58 77 75 73 71 69 67 65 63 61 59 57 54 51 48 46 44 42 40 37 38 77 76 74 72 71 69 67 65 63 61 59 57 54 51 48 46 64 62 60 58 57 55 52 49 48 66 64 62 60 58 55 52 49 48 65 55 52 49 46 64 62 60 58 55 52 49 66 64 62 60 58 55 52 49 66 64 62 60 58 55 52 49 66 64 62 60 58 55 52 49 66 64 62 60 58 55 52 49 66 64 62 60 58 55 52 49 66 64 62 60 58 55 55 52 49 66 64 62 60 58 55 55 52 49 66 64 62 69 67 65 63 61 59 57 54 50 47 41 42 40 57 55 58 50 47 57 75 73 71 70 68 66 64 62 69 67 65 63 61 59 57 54 51 48 46 64 64 64 64 65 65 65 65 65 65 65 65 65 65 65 65 65  | 23        |          |          |      |       | 29         |            |      | 14  | 10  | 5   |      | 2    |
| 26  |           | 49       |          |      |       |            |            |      |     | 14  | 9   |      |      |
| 27         55         51         47         44         40         36         33         29         25         21         17         15           28         57         53         50         46         43         39         36         52         28         24         21         18           39         59         57         54         50         47         43         40         37         34         30         27         25           31         61         58         55         52         49         46         43         40         36         33         30         27         25           31         61         58         55         52         49         46         43         40         36         33         30         27         25           31         61         58         55         52         49         46         43         40         36         33         30         22           32         68         60         58         55         52         49         46         43         30         33         33         33         33         33         33   | 26        | 53       |          |      |       |            |            |      |     |     |     |      |      |
| 28  | 27        | 55       |          |      |       |            |            |      |     |     | 21  | 17   |      |
| 30         59         57         54         50         47         43         40         37         34         30         27         25           31         61         58         55         52         49         46         43         40         36         33         50         28           32         63         60         57         54         51         48         45         42         39         35         32         30           33         64         62         59         56         53         50         47         44         41         38         35         33           34         66         63         60         58         55         52         49         46         43         40         37         36           36         68         66         63         61         58         55         53         50         47         44         42         39         38         36         68         66         63         61         58         55         53         50         47         44         42         40           37         70         68         66   | 28        |          | 53       |      |       |            |            | 36   |     |     |     |      |      |
| 31 61 58 55 52 49 46 43 40 36 33 50 28 32 63 60 57 54 51 48 45 42 39 35 32 30 33 64 62 59 56 53 50 47 44 41 38 35 33 54 66 63 60 58 55 52 49 46 43 40 37 36 35 67 64 62 59 56 54 51 48 45 42 39 38 36 68 66 63 61 58 55 53 50 47 44 42 40 37 69 67 64 62 59 57 54 52 49 46 44 42 38 71 68 66 63 61 58 55 53 50 47 44 42 38 71 68 66 63 61 58 55 53 50 47 44 42 39 72 69 67 65 62 60 57 55 53 50 48 46 40 73 70 68 66 63 61 58 56 53 51 48 46 44 39 72 69 67 65 62 60 57 55 53 50 48 41 73 71 69 67 65 62 60 57 55 53 50 48 44 76 74 72 70 68 66 64 62 60 57 55 53 44 76 74 72 70 68 66 64 62 60 57 55 53 44 76 74 72 70 68 66 64 62 60 57 55 53 44 77 79 77 75 73 71 69 67 65 63 61 59 57 54 53 45 77 75 73 71 69 67 65 63 66 64 62 60 58 56 45 77 75 73 71 69 67 65 63 61 59 57 54 53 46 78 76 74 72 70 68 66 64 62 60 58 56 57 46 78 76 74 72 70 69 67 65 63 61 59 57 54 53 48 79 78 76 74 72 70 68 66 64 62 60 58 56 57 48 79 78 76 74 72 70 68 66 64 62 60 58 56 58 50 81 79 77 76 74 73 71 70 68 66 64 62 51 81 80 78 77 75 73 71 70 68 66 64 62 60 58 57 54 88 89 81 80 78 77 75 74 72 71 69 67 65 63 63 55 84 83 81 80 78 77 75 74 72 71 69 67 65 63 63 55 84 83 81 80 78 77 75 74 72 71 69 67 65 63 63 55 84 83 81 80 78 77 75 74 72 71 69 67 65 63 63 56 84 83 82 81 79 78 76 75 74 73 71 70 68 66 54 88 89 81 79 78 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 75 73 72 70 70 56 84 83 82 81 79 78 76 75 73 72 70 70 56 84 83 82 81 79 78 76 75 73 72 70 70 56 84 83 82 81 79 78 76 75 74 72 71 75 74 72 71 69 68 56 84 83 82 81 79 78 76 75 73 72 70 70 56 84 83 82 81 79 78 76 75 74 72 71 75 74 72 | 29        |          |          |      |       |            |            |      |     | 31  | 27  |      |      |
| 32         63         60         57         54         51         48         45         42         39         35         32         90           33         64         62         59         56         53         50         47         44         41         38         35         35           34         66         63         60         58         55         52         49         46         43         40         37         36           36         68         66         63         61         58         55         53         50         47         44         42         39         38           36         68         66         63         61         58         55         53         50         47         44         42         40           37         69         67         64         62         59         57         54         52         49         46         44         42         38           37         70         68         66         63         61         58         56         53         50         48         46         40         73         70         68   |           |          |          | ·    |       |            |            |      |     |     |     |      |      |
| 33         64         62         59         56         53         50         47         44         41         38         35         33           34         66         63         60         58         55         52         49         46         43         40         37         36           36         68         66         63         61         58         55         53         50         47         44         42         39         38           36         68         66         63         61         58         55         53         50         47         44         42         40           37         69         67         64         62         59         .57         54         52         49         46         44         42         38         31         66         63         61         58         56         53         51         48         46         44         42         34         44         44         42         34         44         44         43         34         46         44         44         43         44         44         44         44         42         44 <td></td> <td></td> <td></td> <td>57</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>30</td>  |           |          |          | 57   |       |            |            |      |     |     |     |      | 30   |
| 35         67         64         62         59         56         54         51         48         45         42         39         \$8           36         68         66         63         61         58         55         53         50         47         44         42         40           37         69         67         64         62         59         57         54         52         49         46         44         42         38         71         68         66         63         61         58         56         53         51         48         46         44         43         48         40         73         70         68         66         63         61         59         57         54         52         49         48           41         73         71         69         67         65         63         60         58         56         54         51         50         42         44         42         74         72         70         68         66         64         62         60         57         55         53         52         43         44         72         70 <td>33</td> <td>64</td> <td>62</td> <td>59</td> <td>56</td> <td><i>5</i>8</td> <td>50</td> <td>47</td> <td></td> <td>41</td> <td>38</td> <td>35</td> <td>33</td>  | 33        | 64       | 62       | 59   | 56    | <i>5</i> 8 | 50         | 47   |     | 41  | 38  | 35   | 33   |
| 36         68         66         63         61         58         55         53         50         47         44         42         40           37         69         67         64         62         59         57         54         52         49         46         44         42         40           38         71         68         66         63         61         58         56         53         51         48         46         44         42           49         72         69         67         65         62         60         57         55         53         50         48         46         44           40         73         70         68         66         63         61         59         57         54         52         49         48           41         73         71         69         67         65         63         60         58         56         54         51         50           42         74         72         70         68         66         64         62         60         58         56         54         53         54         53   |           | 66       |          |      |       |            |            |      |     |     |     |      | 36   |
| 37         69         67         64         62         59         57         54         52         49         46         44         42           38         71         68         66         63         61         58         56         53         51         48         46         44           39         72         69         67         65         62         60         57         55         53         50         48         46           40         73         70         68         66         63         61         59         57         54         52         49         48           41         73         71         69         67         65         63         60         58         56         54         51         49           42         74         72         70         68         66         64         62         60         57         55         53         52           43         75         73         71         69         67         65         63         61         59         57         54         53           44         76         74         72  | 35        |          |          |      |       |            |            |      |     |     |     |      |      |
| 59         72         69         67         65         62         60         57         55         53         50         48         46           40         73         70         68         66         63         61         59         57         54         52         49         48           41         73         71         69         67         65         63         60         58         56         54         51         50           42         74         72         70         68         66         64         62         60         57         55         53         52           43         75         73         71         69         67         65         63         61         59         57         54         53           44         76         74         72         70         68         66         64         62         60         58         56         55           45         77         75         73         71         69         67         66         64         62         60         58         57           46         78         76         74  | 37        | 69       | 67       |      |       |            |            |      |     |     | 46  |      |      |
| 40 73 70 68 66 63 61 59 57 54 52 49 48  41 73 71 69 67 65 63 60 58 56 54 51 50  42 74 72 70 68 66 64 62 60 57 55 53  43 75 73 71 69 67 65 63 61 59 57 54 53  44 76 74 72 70 68 66 64 62 60 57 55 53  45 77 75 73 71 69 67 65 63 61 59 57 54 53  46 78 76 74 72 70 68 66 64 62 60 58 56  47 79 77 75 73 71 70 68 66 64 62 60 58 56  48 79 78 76 74 72 70 69 67 65 63 61 59  48 79 78 76 74 72 70 69 67 65 63 61 59  48 79 78 76 74 72 71 69 67 65 63 61 59  48 79 78 76 74 72 71 69 67 65 64 62 60 58  50 81 79 77 76 74 73 71 70 68 66 64 62  51 81 80 78 77 75 73 71 70 68 66 64 62  52 82 81 79 78 76 74 73 71 70 68 66 64 64  51 81 80 78 77 75 73 71 70 68 66 64 65  52 82 81 79 78 76 75 73 72 70 68 66 64 64  51 81 80 78 77 75 74 72 71 69 67 65 63  52 82 81 79 78 76 75 73 72 70 68 66 64 64  51 81 80 78 77 75 74 72 71 69 67 65 63  52 82 81 79 78 76 75 73 72 70 68 66 64 64  51 81 80 78 77 75 74 72 71 69 67 65 63  52 82 81 79 78 76 75 73 72 70 68 66 64 64  51 81 80 78 77 75 74 72 71 69 67 65 63  52 82 81 79 78 76 75 73 72 70 68 67 65  53 83 81 80 78 77 75 74 72 71 69 67 66 65  54 83 82 81 79 78 76 75 73 72 70 68 67 65  55 84 83 81 80 78 77 75 74 75 74 73 71 70 68 67  55 84 83 81 80 79 77 76 75 74 73 71 70 70 70  56 84 83 82 81 79 78 76 75 74 72 71 75 74 72 71 71  57 85 84 83 81 80 79 78 76 75 74 72 71 75 74 72 71  58 86 84 83 82 81 79 78 76 75 75 74 72 71 75 74 72 71  58 86 84 83 82 81 80 79 78 77 75 74 77 75 74 72 71   | 38        |          | 68       |      |       |            | <i>5</i> 8 |      | 53  | 51  |     | 46   |      |
| 41 73 71 69 67 65 63 60 58 56 54 51 50 42 74 72 70 68 66 64 62 60 57 55 53 52 43 75 73 71 69 67 65 63 61 59 57 54 53 44 76 74 72 70 68 66 64 62 60 58 56 55 45 77 75 73 71 69 67 66 64 62 60 58 56 46 78 76 74 72 70 69 67 66 64 62 60 58 57 46 78 76 74 72 70 69 67 66 64 62 60 58 57 48 79 77 75 73 71 70 68 66 64 62 60 58 57 48 79 78 76 74 72 70 69 67 65 63 61 59 58 47 79 77 75 73 71 70 68 66 64 62 60 59 48 79 78 76 74 72 71 69 67 65 63 61 59 58 50 81 79 77 76 74 73 71 70 68 66 64 62 51 81 80 78 77 75 74 72 71 69 67 65 63 52 82 81 79 78 76 75 74 72 71 69 67 66 65 53 83 81 80 78 77 75 74 72 71 69 67 66 65 54 88 82 81 79 78 76 75 73 72 70 68 67 65 55 84 83 81 80 79 77 76 75 74 72 71 69 68 67 55 84 83 81 80 79 77 76 75 74 72 71 69 68 67 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 73 71 71 57 85 84 83 81 80 79 78 77 75 74 73 71 71 58 86 84 83 81 80 79 78 77 75 74 79 79 78 59 86 85 84 83 82 81 80 79 78 77 76 75 74 72   | 39        |          | 69       | 67   | 65    |            |            | 57   | 55  | 53  |     |      |      |
| 42         74         72         70         68         66         64         62         60         57         55         53         52           48         75         73         71         69         67         65         63         61         59         57         54         53           44         76         74         72         70         68         66         64         62         60         58         56         55           45         77         75         73         71         69         67         65         64         62         60         58         56           46         78         76         74         72         70         69         67         65         63         61         59         58           47         79         77         75         73         71         70         68         66         64         62         60         59         58           48         79         78         76         74         72         71         69         67         65         64         62         61         64         62         61         64   |           |          |          |      |       | l          |            |      | 1   |     |     |      |      |
| 48 75 73 71 69 67 65 63 61 59 57 54 53 44 76 74 72 70 68 66 64 62 60 58 56 45 77 75 73 71 69 67 66 64 62 60 58 57 46 78 76 74 72 70 69 67 66 63 61 59 48 79 77 75 73 71 70 68 66 64 62 60 58 47 79 77 75 73 71 70 68 66 64 62 60 59 48 79 78 76 74 72 71 69 67 65 64 62 60 49 80 78 77 75 73 72 70 68 67 65 63 61 50 81 79 77 76 74 73 71 70 68 66 64 64 51 81 80 78 77 75 74 72 71 69 67 66 65 52 82 81 79 78 76 75 73 72 70 68 66 64 64 51 81 80 78 77 75 74 72 71 69 67 66 65 53 83 81 80 78 77 75 74 72 71 69 67 66 65 53 83 81 80 78 77 75 74 72 71 69 67 66 65 54 88 89 81 79 78 76 75 73 72 70 68 67 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 71 71 71 71 71 71 71 71 71 71 71 71   | 4I<br>42  | 73       |          | 69   |       | 65         |            |      |     |     |     | 51   |      |
| 44         76         74         72         70         68         66         64         62         60         58         56         55           45         77         75         73         71         69         67         66         64         62         60         58         57           46         78         76         74         72         70         69         67         65         63         61         59         58           47         79         77         75         73         71         70         68         66         64         62         60         59           48         79         78         76         74         72         71         69         67         65         64         62         60         59           49         80         78         77         75         73         72         70         68         67         65         63         62           50         81         79         77         75         74         72         71         69         67         66         65           52         82         81         79  | 48        |          |          | 71   | 69    | 67         |            |      |     | 59  | 57  | 54   | 53   |
| 46         78         76         74         72         70         69         67         65         63         61         59         58           47         79         77         75         73         71         70         68         66         64         62         60         59           48         79         78         76         74         72         71         69         67         65         64         62         61           49         80         78         77         75         73         72         70         68         67         65         63         62           50         81         79         77         76         74         73         71         70         68         66         64         64           51         81         80         78         77         75         74         72         71         69         67         66         65           52         82         81         79         78         76         75         73         79         70         68         67         66           53         83         81         80  | 44        | 76       | 74       | 72   | 70    | 68         | 66         | 64   | 62  | 60  | 58  | 56   |      |
| 47 79 77 75 73 71 70 68 66 64 62 60 59 48 79 78 76 74 72 71 69 67 65 64 62 61 49 80 78 77 75 73 72 70 68 67 65 63 63 50 81 79 77 76 74 73 71 70 68 66 64 64 51 81 80 78 77 75 74 72 71 69 67 66 65 52 82 81 79 78 76 75 73 72 70 68 67 66 65 53 83 81 80 78 77 75 74 72 71 69 67 66 67 54 88 82 81 79 78 76 75 73 71 70 68 67 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 69 68 55 84 83 81 80 79 77 76 75 74 72 71 70 70 56 84 83 82 81 79 78 76 75 74 72 71 71 71 71 71 71 71 71 71 71 71 71 71   |           |          |          | 73   | 71    | 69         |            |      |     |     | 60  |      |      |
| 48         79         78         76         74         72         71         69         67         65         64         62         61           49         80         78         77         75         73         72         70         68         67         65         63         62           50         81         79         77         76         74         73         71         70         68         66         64         64           51         81         80         78         77         75         74         72         71         69         67         66         65           52         82         81         79         78         76         75         73         72         70         68         67         66         65           53         83         81         80         78         77         75         74         73         71         70         68         67         66         65         65         65         65         65         65         65         65         65         65         65         73         71         70         68         67         66  |           |          |          | 75   |       |            | 70         |      | 66  |     | 60  |      |      |
| 49         80         78         77         75         73         72         70         68         67         65         63         62           50         81         79         77         76         74         73         71         70         68         66         64         64           51         81         80         78         77         75         74         72         71         69         67         66         65           52         82         81         79         78         76         75         73         72         70         68         67         66         65           53         83         81         80         78         77         75         74         72         71         69         67         66         65           53         83         81         80         78         77         75         74         73         71         70         68         67         66         65         63         68         63         68         68         68         68         68         68         68         68         68         68         84         83  |           |          |          |      | 74    | 72         |            |      |     |     | 64  | 62   | 61   |
| 51         81         80         78         77         75         74         72         71         69         67         66         65           52         82         81         79         78         76         75         73         72         70         68         67         66           53         83         81         80         78         77         75         74         73         71         70         68         67           54         83         82         81         79         78         76         75         74         72         71         69         68           55         84         83         81         80         79         77         76         75         74         72         71         69         68           55         84         83         82         81         79         78         77         75         74         72         71         69         68           55         84         83         82         81         79         78         77         75         74         72         70         70         70         70         70   | 49        | 80       | 78       | 77   |       | 78         | 72         | 70   | 68  | 67  | 65  | 63   |      |
| 52         82         81         79         78         76         75         73         72         70         68         67         66           53         83         81         80         78         77         75         74         73         71         70         68         67         66         67         68         67         68         67         68         67         68         67         71         70         68         68         68         68         68         68         68         68         68         68         68         68         68         68         68         68         70 </td <td>-</td> <td><u> </u></td> <td></td> <td></td> <td></td> <td></td> <td>73</td> <td>71</td> <td></td> <td>l</td> <td>66</td> <td></td> <td></td>   | -         | <u> </u> |          |      |       |            | 73         | 71   |     | l   | 66  |      |      |
| 53         83         81         80         78         77         75         74         73         71         70         68         67           54         83         89         81         79         78         76         75         74         72         71         69         68           55         84         83         81         80         79         77         76         75         73         72         70 <td></td> <td>•</td> <td></td>  |           |          |          |      |       |            |            |      |     |     |     | •    |      |
| 54         88         82         81         79         78         76         75         74         72         71         69         68           55         84         83         81         80         79         77         76         75         73         72         70         70           56         84         83         82         81         79         78         77         75         74         73         71         72         70 <td>52<br/>59</td> <td></td>  | 52<br>59  |          |          |      |       |            |            |      |     |     |     |      |      |
| 55. 84 83 81 80 79 77 76 75 73 72 70 70 70 56 84 83 82 81 79 78 77 75 74 73 71 71 71 75 85 84 83 81 80 79 78 77 76 75 74 72 72 72 58 86 84 83 81 80 79 78 77 76 75 74 72 72 72 59 86 85 84 83 82 80 79 78 77 76 75 74 74 74   | 54        |          |          |      |       |            |            |      |     |     |     |      |      |
| 58   86   84   83   82   81   80   78   77   76   75   79   75   79   75   79   76   74   74   74   74   74   74   74   | <b>55</b> | 84       | 83       | 81,  |       |            |            |      |     |     |     | 70   | 70   |
| 58   86   84   83   82   81   80   78   77   76   75   79   75   79   75   79   76   74   74   74   74   74   74   74   | 56        |          |          | 82   | 81    | 79         | 78         | 77   | 75  | 74  | 78  |      |      |
| 59 86 85 84 83 82 80 79 78 77 76 74 74  | 57<br>52  |          |          |      |       |            |            |      |     |     |     |      |      |
| 60   87   86   85   83   82   81   80   79   78   77   75   76  | 59        |          |          |      |       |            |            |      |     |     |     |      | 74   |
|   | 60        |          | .86      |      |       |            |            |      |     |     |     |      |      |

#### TO FIND THE CORRECTION OF THE COMPUTED LATITUDE.

## .TABLE XXXVIII.

| 1        | -          | PART I     | I. The     | Latitud    | de and I    | Declinat           | ion bei    | ng of a     | contra     | ry Nam     | e. '         |            |
|----------|------------|------------|------------|------------|-------------|--------------------|------------|-------------|------------|------------|--------------|------------|
| Arg.     | <u>L.</u>  |            |            | ument.     |             | ITANL              |            | THE         |            |            |              |            |
| Lat.     | 130        | 140        | 15°        | 160        | 173         | 18°                | 19°        | 200         | 210        | 220        | 230          | 12310      |
| 10       | 1422       | 1528       | 1635       | 1749       | 1852        | 1962               | 2073       | 2185        | 2299       | 2425       | 2532         | 2591       |
| 2 3      | 761<br>541 | 814<br>576 | 867        | 921        | 975         | 1030               | 1086       | 1142        | 1199       | 1257       | 1315<br>910  | 1845       |
| 4        | 430        | 457        | 611<br>483 | 647<br>510 | 683<br>537  | 720<br>565         | 757<br>592 | 794<br>620  | 832<br>649 | 678        | 707          | 932        |
| 5        | 364        | 585        | 406        | 428        | 449         | 471                | 494        | 516         | 539        | 562        | 585          | 597        |
| 6        | 319        | 337        | 355        | 373        | 391         | 409                | 428        | 446         | 465        | 484        | 504          | 514        |
| 8        | 288        | 303        | 318        | 383<br>304 | 349         | 365.<br>331·       | 380        | 396<br>359  | 413<br>373 | 429<br>387 | 446          | 454<br>409 |
| 9        | 246        | 257        | 269        | 281        | 293         | 305                | 317        | 329         | 342        | 355        | 368          | 374        |
| 10       | 231        | 242        | 255        | 263        | 273         | 284                | 295        | 306         | 318        | 329        | 341          | 347        |
| 11       | 219        | 228        | 238        | 248        | 258         | 267                | 277        | 287         | 298<br>280 | 308        | 318<br>300   | 328<br>305 |
| 12<br>13 | 209        | 218<br>208 | 226<br>216 | 235<br>224 | 244<br>233  | 253<br>241         | 262<br>249 | 271<br>257  | 266        | 274        | 284          | 288        |
| 14       | 193        | 200        | 207        | 215        | 223         | 230                | 238        | 246         | . 254      | 262        | 270          | 274        |
| 15       | 186        | 193        | 200        | 206        | 214         | 221                | 228        | 236         | 243        | 251        | 259          | 262        |
| 16<br>17 | 181        | 187<br>181 | 194        | 200        | 206<br>200  | 213<br>206         | 220<br>212 | 227<br>218  | 234<br>226 | 232        | 248<br>238   | 252<br>242 |
| 18       | 171        | 176        | 183        | 188        | 194         | 200                | 206        | 212         | 219        | 224        | 230          | 234        |
| 19       | 167        | 172        | 178        | 183        | 189         | 194                | 200        | 206         | 212        | 217        | 223          | 226        |
| 20       | 163        | 168        | 174        | 179        | 184         | 189                | 195        | 200         | 206        | 211        | 216          | 220        |
| 21       | 160        | 165        | 170        | 175        | 180         | 185                | 190        | 195         | 200        | 205        | 210          | 213        |
| 22<br>23 | 157<br>154 | 162<br>159 | 166<br>163 | 17I<br>167 | 175         | 181                | 185<br>181 | 190<br>186  | 195<br>190 | 200<br>195 | 205<br>200   | 207<br>202 |
| 24       | 151        | 156        | 160        | 164        | 168         | 173                | .177       | 182         | 186        | 191        | 195          | 198        |
| 25       | .149       | 153        | 157        | 161        | 166         | 170                | 174        | 178         | 182        | 187        | 191          | 193        |
| 26<br>27 | 147        | 151<br>149 | 155<br>153 | 158        | 163         | 167<br>164         | 170<br>167 | 174<br>171. | 178<br>175 | 183<br>179 | 187<br>183   | 189<br>185 |
| 28       | 145<br>143 | 149        | 150        | 156<br>154 | 160<br>157  | 161                | 164        | 168         | 172        | 176        | 179          | 182        |
| 29       | 142        | 14.5       | 148        | 152        | 155         | 159                | 162        | 166         | 169        | 173        | . 176        | 179        |
| 30       | 141        | 143        | 146        | 150        | 153         | 157                | 160        | 163         | 166        | 170        | 173          | 175        |
| 31       | 139        | 142        | 145        | 148        | 151         | 154                | 157        | 160         | 164        | 167        | 170          | 179        |
| 32<br>33 | 137<br>136 | 140<br>138 | 143        | 146<br>144 | 149<br>147  | 152<br>150         | 155<br>153 | 158<br>156  | 161<br>159 | 165<br>162 | 168<br>165   | 167        |
| 34       | 134        | 137        | 140        | 142        | 145         | 148                | 151        | 154         | 157        | 160        | 163          | 164        |
| 35       | 133        | 136        | 138        | 141        | 144         | 146                | 149        | 152         | 155        | 158        | 161          | 162        |
| 36<br>37 | 132<br>131 | 134<br>133 | 137<br>136 | 139<br>138 | 142<br>.141 | 145<br>143         | 147<br>146 | 150<br>148  | 153<br>151 | 156        | 158<br>156   | 160<br>158 |
| 38       | 129        | 132        | 134        | 137        | 139         | 142                | 144        | 147         | 149        | 152        | 154          | 156        |
| 39       | 128        | 131        | 133        | 135        | 138         | 140                | 143        | 145         | 147.       | 150        | 152          | 154        |
| 40       | 127        | . 130      | 132        | 134        | 137         | 139                | 141        | 143         | 146        | 148        | 151          | 152        |
| 41<br>42 | 127        | 129<br>128 | 131<br>150 | 133        | 135         | 137                | 140<br>138 | 142<br>140  | 144<br>143 | 146<br>145 | 149<br>147   | 150<br>148 |
| 43       | 126<br>125 | 128        | 129        | 132<br>131 | 134<br>133  | 136<br>1 <b>35</b> | 137        | 139         | 143        | 143        | 146          | 147        |
| 44       | 124        | 126        | 128        | 130        | 132         | 134                | 136        | 138         | 140        | 142        | 144          | 145        |
| 45       | 128        | 125        | 127        | 129        | 131         | 133                | 134        | 136         | 138        | 140        | 142          | 143<br>142 |
| 46<br>47 | 192<br>121 | 124<br>123 | 126<br>125 | 128<br>127 | 130<br>129  | 131<br>130         | 133<br>132 | 135<br>134  | 137<br>136 | 139<br>138 | 141<br>140   | 141        |
| 48       | 121        | 122        | 124        | 126        | 128         | 129                | 131        | 133         | 135        | 136        | 138          | 139        |
| 49       | 120        | 122        | 123        | 125        | 127         | 128                | 180        | 132         | 133        | 185        | 137          | 138        |
| 50       | 119        | 121        | 123        | 124        | 126         | 127                | 129        | 180         | 132        | 134        | 136          | 136        |
| 51<br>52 | 119<br>118 | 120<br>119 | 122<br>121 | 123<br>122 | 125<br>124  | 126<br>125         | 128<br>127 | 129<br>128  | 181        | 193<br>132 | 194<br>193   | 135<br>134 |
| 53       | 117        | -119       | 120.       | 122        | 123         | 125                | 126        | 127         | 129        | 150        | 192          | 193        |
| 54       | 117        | 118        | 119        | 121        | 122         | 124                | 125        | 126         | 128        | 129        | 131          | 132        |
| 55<br>56 | 116        | 117        | 119        | 120        | 121<br>121  | 123<br>122         | 124<br>123 | 125<br>125  | 127<br>126 | 128<br>127 | 130<br>129   | 129        |
| 57       | 115        | 116        | 117        | 119        | 120         | 121                | 122        | 124         | 125        | 126        | 128          | 128        |
| 58       | 114        | 116        | 117        | 118        | 119         | 120                | 122        | 128         | 124        | 125        | 127          | 127<br>126 |
| 59<br>60 | 114        | 115        | 116        | 117        | 118         | 120                | 121<br>120 | 122<br>121  | 123<br>122 | 194<br>198 | 126  <br>125 | 125        |
| , ~~ 1   |            | ***        | 1 0 1      | 441        | +40 l       | 117                | 120        | 101         | 122        | 12.7       | 1 00 1       |            |

## TABLE XXXIX.

PART I.

Both Observations on the same Side of the Meridian.

|              |          |           |          |           |          |          | Α        | rgum     | en <b>t.</b> | RIS        | NG.      |          |          |           |           |          |          |          |
|--------------|----------|-----------|----------|-----------|----------|----------|----------|----------|--------------|------------|----------|----------|----------|-----------|-----------|----------|----------|----------|
| Arg.<br>Mid. |          | , c       | Ho       | ur.       |          |          |          | 1 F      | lour,        | ,          |          |          |          | 2 H       | ours.     |          |          | s H      |
| time.        | 10'      | 20        | 30'      | 40′       | 50′      | 0'       | 10'      | 201      | 30'          | 40/        | 50/      | OF       | 10       | 20/       | 30        | 40       | 50       | O'       |
| 0/10         | O        | 0         |          |           |          |          |          |          |              |            | 1        |          |          |           |           |          |          |          |
| 20           | 0        | 0         | 0        | 0         |          |          |          |          |              |            | į        |          |          |           |           |          |          | 1        |
| 30<br>40     | 0        | 1         | 1        | 1         | 0        | 0        | 0        | _        | ١.           |            | 1        |          |          | 1         | 1         |          |          | 1        |
| 50           | 1        | 1 2       | 1 2      | 2 2       | 1 2      | 2        | 1 2      | 0 2      | 0            | 0          | 0        | 13       |          |           |           |          |          | 1        |
| 1 0          | <u> </u> | 2         | 3        | 3         | 3        | 4        | 3        | 3        | 3            | 2          | 1        | 0        | 0        | -         | -         | -        | -        | -        |
| 10           | i        | 2         | 3        | 4         | 4        | 5        | 5        | 5        | 4            | 4          | 3        | 2        | 1        | 0         | 0         |          | 12.7     |          |
| 20           | 1        | 3         | 4        | 5         | 6        | 6        | 6        | •        | 6            | 6          | 5        | 5        | 4        | 3         | 1         | 0        | 0        | 1        |
| 30           | 2        | 3         | 5        | 6         | 7        | 7        | 8        | 8        | 8            | -8         | 8        | 7        | 7        | 6         | 15        | 3        | 2        | 0        |
| 40           | 2        | 4         | 5        | 7         | 8        | 9        | 9        | 10       | 10           | 10         | 10       | 10       | 9        | 9         | 8         | 7        | 5        | 4        |
| 50           | 2        | 4         | 6        | 8         | 9        | 10       | 11       | 12       | 12           | 13         | 13       | 13       | 12       | 12        | 11.       | 10.      | 9.       | 8        |
| 2 0          | 2        | 5         | 7        | 9         | 10       | 11       | 13       | 14       | 15           | 16         | 15       | 15       | 15       | 15        | 14        | 14       | 13       | 12       |
| 10           | 3        | 5         | 7        | 10        | 11       | 13       | 15       | TG.      | 17           | 17         | 18       | 18       | 19       | 18        | 18        | 17       | 17       | 16       |
| 20           | 3        | 6         | 8        | 11        | 13       | 15       | 16       | 18       | 19           | 20         | 21       | 22       | 22       | 22        | 22        | 22       | 21       | 20       |
| 30<br>40     | 3        | . 6       | 9        | 12        | 14       | 16       | 18       | 20       | 22           | 28         | 24       | 25       | 2.5      | 26        | 26        | 26       | 26       | 25       |
| 50           | 4        | 7         | 10       | 13        | 16       | 18       | 21       | 23       | 24           | 26         | 27       | 29       | 29       | 30        | 30        | 80       | 80       | 30       |
| -            |          | 8         | 11       | 14        | 17       | 20       | 23       | 25       | 27           | 29         | SI       | 32       | 33       | 34        | 35        | 36       | -        | -        |
| 3 0          | 4        | .8        | 12       | 16        | 19       | 22       | 25       | 28       | 31           | 83         | 35       | 97       | 38       | 89        | 40        | 41       | 41       | 41       |
| 10<br>20     | 5        | 9         | 13       | 17        | 51       | 25       | 28       | 31       | 34           | 37         | 39       | 41       | 43       | 45        | 46        | 47       | 47       | 48       |
| 30           | 5        | 10        | 15       | 19        | 23       | 27       | 31       | 35       | 33           | 41         | 44       | 46       | 48       | 50        | 52<br>59  | 53<br>60 | 54<br>62 | 55<br>63 |
| 40           | 6        | 12        | 16<br>18 | 21<br>23  | 26<br>29 | 30<br>34 | 34<br>38 | 39<br>43 | 42<br>47     | 46<br>51   | 49<br>54 | 52<br>58 | 54<br>61 | 57<br>64  | 66        | 68       | 70       | 72       |
| 50           |          | 13        | 20       | 26        | 32       | 37       | 42       | 48       | 53           | 57         | 61       | 65       | 68       | 72        | 75        | 77       | 80       | 82       |
| 4 0          |          |           |          |           | ·I       |          |          |          |              |            |          |          | -        |           | -         | -        |          | 93       |
| 10           | 8 !      | 15        | 22       | 29        | 35       | 41       | 47       | 58       | 59           | 64         | 68       | 73       | 77       | 81        | 85        | 88       | 91       | 106      |
| 20           |          | 16<br>-18 | 24       | 32        | 39       | 46       | 53<br>60 | 60       | 66           | 72<br>81 - | 77       | 83<br>94 | 99       | 92<br>105 | 96<br>108 | 114      | 118      | 122      |
| so           |          | 20        | 27<br>30 | 3.6<br>40 | 44<br>50 | 52<br>59 | 68       | 67<br>77 | 74<br>85     | 93         | 100      | 107      | 114      | 120       |           | 132      |          | 141      |

PART IL

The Observations on contrary Sides of the Meridian.

|              | _  |     | _   |     |      |    | $\mathbf{A}_{i}$ | rgum | ent.  | RISI | NG. |    |     |     |       |     |     |     |
|--------------|----|-----|-----|-----|------|----|------------------|------|-------|------|-----|----|-----|-----|-------|-----|-----|-----|
| Arg.<br>Viid |    | . 0 | Hou | ır. |      |    |                  | 1 F  | lour. |      |     |    |     | 2 H | ours. |     |     | 3 H |
| - 1          | ΙÓ | 20  | 30  | 40/ | 50/  | O/ | 10               | 20'  | SO/   | 40   | 50' | 0′ | 10' | 201 | 30/   | 40  | 50′ | 0/  |
| pIO          | 0  | 1   | 1   | 2   | 3    | 5  | 6                | 8    | 9     | 11   | 13  | 16 | 18  | 21  | 23    | 26  | 29  | 32  |
| 20           | 0  | 1   | 2   | 3   | 4    | 6  | 7                | 9    | 11    | 13   | 15  | 18 | 20  | 23  | 26    | 29  | 32  | 35  |
| 30           | 1  | 2   | 3   | 4   | 5    | 7  | 9                | 10   | 13    | 15   | 17  | 20 | 23  | 26  | 29    | 32  | 3.5 | 38  |
| 40           | 1  | 2   | 3   | 5   | 6    | 8  | 10               | 12   | 14    | 17   | 19  | 22 | 25  | 28  | 51    | 35  | 38  | 42  |
| 50           | 1  | 2   | 4   | 5   | 7    | 9  | 11               | 14   | 16    | 19   | 22  | 24 | 28  | 31  | 34    | 38  | 41  |     |
| 0            | 1  | 3   | 4   | 6   | 8    | 10 | 13               | 15   | 18    | 21   | 24  | 27 | 30  | 83  | 37    | 41  | -   |     |
| 10           | 1  | 3   | 5   | 7   | 9    | 12 | 14               | 17   | 20    | 23   | 26  | 29 | 33  | 56  | 40    |     | - 4 |     |
| 20           | 2  | 4   | 5   | 8   | 10   | 13 | 16               | 18   | 21    | 25   | 28  | 32 | 35  | 39  |       | - 1 |     |     |
| 30           | 2  | 4   | 6   | 9   | 11   | 14 | 17               | 20   | 23    | 27   | 30  | 34 | 38  |     | 1     | - 1 | 1 / |     |
| 40           | 2  | 4   | 7   | 10  | 12   | 15 | 19               | 21   | 25    | 29   | 33  | 37 |     | 0 9 | 1     |     |     |     |
| 50           | 2  | 5   | 8   | 11  | 14   | 17 | 20               | 24   | 27    | 31   | 35  | 80 |     |     |       |     |     |     |
| 0            | 3  | 5   | 9   | 12  | 15 ( | 18 | 22               | 26   | 30    | 84   | -   |    |     |     |       |     |     |     |
| 10           | 3  | 6   | 9   | 13  | 16   | 20 | 24               | 28   | 32    |      |     |    |     |     |       |     |     |     |

TABLE XL. '
TO FIND THE CORRECTION OF THE COMPUTED LATITUDE,

| Nº.from<br>Table |            |            |            |            | NUM        | 1BEI     |            | rgun     |          | LE Y     | XXX      | IX.      |          |          |          | 100      | -        |          |
|------------------|------------|------------|------------|------------|------------|----------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| XXXVIII.         | 2          | 3          | 4          | 5          | 6          | 7        | 8          | 9        | 10       | 12       | 14       | 16       | 18       | 20       | 22       | 24       | 26       | 28       |
| 2                | 10         | 7          | 5          | 4          | 3          | 3        | 2          | 2        | 2        | 2        | 1        | ľ        | 1        | 1        | 1        | 1        | 1        | 1        |
| 4                | 20         | 13         | 10         | 8          | 7          | 6        | 5          | 4        | 4        | 3        | 3        | 2        | 2        | 2        | 2        | 2        | 2        | 1        |
| 6                | 30<br>40   | 20         | 15<br>20   | 12<br>16   | 10         | 9        | 7          | 7 9      | 6 8      | 5        | 6        | 5        | 3        | 3        | 3        | 2        | 2        | 2 3      |
| 10               | 50         | 33         | 25         | 20         | 17         | 14       | 12         | 11       | 10       | 8        | 7        | 6        | 6        | 5        | 5        | 3 4      | 3        | 4        |
| 12-              | 60         | 40         | 30         | 24         | 20         | 17       | 15         | 13       | 12       | 10       | 9        | 7        | 7        | 6        | 5        | 5        | 4 5      | 4        |
| 14-              | 70         | 47         | 35         | 28         | 28         | -20      | 17         | 16       | 14       | 12       | 10       | 9        | 8        | 7        | 6        | 6        | 5        | 5        |
| 16               | 80         | 53         | 40         | 32         | 27         | 23       | 20         | 18       | 16       | 13       | 11       | 10       | 9        | 8        | 7        | 7        | 6        | 6        |
| 18               | 100        | 60         | 45<br>50   | 36<br>40   | 33         | 26<br>29 | 22<br>25   | 20<br>22 | 18       | 15       | 13       | 11       | 10       | 9        | 8        | 7 8      | 7 8      | 6        |
| -22              | 110        | 73         | 55         | 44         | 37         | 31       | 27         | 24       | 22       | 18       | 16       | 13       | 12       | 11       | 10       | 9        | 8        | 8        |
| 24               | 120        | 80         | 60         | 48         | 40         | 34       | 30         | 27       | 24       | 20       | 17       | 15       | 13       | 12       | 11       | 10       | 9        | 9        |
| 26               | 130        | 87         | 65         | 52         | 43         | 37       | 32         | 29       | 26       | 22       | 19       | 16       | 14       | 13       | 12       | 11       | 10       | 9        |
| 28               | 140        | 93         | 70         | 56<br>60   | 47         | 40       | 35         | 31       | 28       | 23       | 20       | 17       | 16       | 14       | 13       | 12       | 11       | 10       |
| 32               | 160        | 107        | 75<br>80   | 64         | 50<br>53   | 43       | 37<br>40   | 33       | 32       | 25<br>27 | 21 23    | 19<br>20 | 17       | 15       | 14       | 12       | 12       | 11       |
| 34               | 170        | 118        | 85         | 68         | 57         | 49       | 42         | 38       | 34       | 28       | 24       | 21       | 19       | 17       | 15       | 14       | 13       | 12       |
| 36               | 180        | 120        | 90         | 72         | 60         | 51       | 45         | 40       | 36       | 30       | 26       | 22       | 20       | 18       | 16       | 15       | 14       | 13       |
| 38               | 190        | 127        | 95         | 76         | 63         | 54       | 47         | 42       | 38       | 32       | 27       | 23       | 21       | 19       | 17       | 16       | 15       | 14       |
| 40               | 200        | 133        | 100        | 80         | 67         | 57       | 50         | 44       | 40       | 33       | 29       | 25       | 22       | 20       | 18       | 17       | 15       | 14       |
| 42               | 210        | 140        | 105        | 84         | 70         | 60       | 52         | 47       | 42       | 35       | 30       | 26       | 23       | 21       | 19       | 17       | 16       | 15       |
| 44 46            | 230        | 147        | 110        | 88<br>92   | 78         | 63       | 55         | 49       | 44       | 37       | 31       | 27       | 24       | 22       | 20       | 18       | 17       | 16       |
| 48               | 240        | 160        | 120        | 96         | 77<br>80   | 66<br>69 | 57<br>60   | 51<br>54 | 46       | 38       | 33       | 29<br>30 | 26<br>27 | 23       | 21 22    | 19       | 18<br>18 | 17       |
| 50               | 250        | 167        | 125        | 100        | 83         | 71       | 62         | 56       | 50       | 42       | 36       | 31       | 28       | 25       | 23       | 21       | 19       | 18       |
| 52               | 260        | 173        | 130        | 104        | 87         | 74       | 65         | 58       | 52       | 43       | 37       | 32       | 29       | 26       | 24       | 22       | 20       | 19       |
| - 54             | 270        | 180        | 135        | 108        | 90         | 77       | 67         | 60       | 54       | 45       | 39       | 33       | 30       | 27       | 25       | 22       | 21       | 19       |
| 56               | 280        | 187        | 140        | 112        | 93         | 80       | 70         | 62       | 56       | 47       | 40       | 35       | 31       | 28       | 25       | 23       | 22       | 20       |
| 60               | 290<br>300 | 193        | 145        | 116        | 97         | 83       | 72<br>75   | 64       | 58<br>60 | 48<br>50 | 41       | 36       | 32       | 29       | 26<br>27 | 24 25    | 22       | 21       |
| 62               | 310        | 207        | 155        | 124        | 103        | 89       | 77         | 69       | 62       | 52       | 44       | 39       | 34       | 31       | 28       | 26       | 24       | 22       |
| 64               | 320        | 213        | 160        | 128        | 107        | 91       | 80         | 71       | 64       | 53       | 46       | 40       | 36       | 32       | 29       | 27       | 25       | 23       |
| 66               | 330        | 220        | 165        | 132        | 110        | 94       | 82         | 73       | 66       | 55       | 47       | 41       | 37       | 33       | 30       | 27       | 25       | 24       |
| 68               | 340        | 227        | 170        | 136        | 113        | 97       | 85         | 76       | 68       | 57       | 49       | 42       | 38       | 34       | 31       | 28       | 26       | 24       |
| 70               | 350<br>360 | 233<br>240 | 175        | 140        | 117        | 100      | 87         | 78       | 70       | 58       | 50       | 43       | .39      | 35       | 32       | 29       | 27       | 25       |
| 74               | 370        | 247        | 180        | 144        | 120        | 103      | 90         | 80       | 72       | 60       | 51<br>53 | 45       | 40       | 36       | 53       | 30       | 28<br>28 | 26<br>26 |
| 76               | 380        | 253        | 190        | 152        | 127        | 109      | 95         | 84       | 76       | 62       | 54       | 47       | 42       | 37       | 35       | 31       | 29       | 27       |
| 78               | 390        | 260        | 195        | 156        | 130        | 111      | 97         | 87       | 78       | 65       | 56       | 49       | 43       | 39       | 35       | 32       | 30       | 28       |
| 80               | 400        | 267        | 200        | 160        | 133        | 114      | 100        | 89       | 80       | 67       | 57       | 50       | 44       | 40       | 36       | 33       | 31       | 29       |
| 82<br>84         | 410<br>420 | 273<br>280 | 205<br>210 | 164<br>168 | 137<br>140 | 117      | 102<br>105 | 91       | 82       | 68       | 59       | 51<br>52 | 46       | 41       | 37       | 34       | 32       | 29<br>30 |
| 86               | 430        | 287        | 215        | 172        | 143        | 123      | 103        | 93<br>96 | 84       | 70<br>72 | 60       | 53       | 47       | 42       | 38       | 35<br>36 | 53       | 31       |
| 88               | 440        | 293        | 220        | 176        | 147        | 126      | 110        | 98       | 88       | 73       | 63       | 55       | 49       | 44       | 40       | 37       | 34       | 31       |
| 90               | 450        | 300        | 225        | 180        | 150        | 129      | 112        | 100      | 90       | 75       | 64       | 56       | 50       | 45       | 41       | 37       | 35       | 32       |
| 92               | 460        | 307        | 230        | 184        | 153        | 131      | 115        | 102      | 92       | 77       | 66       | 57       | 51       | 46       | 42       | 38       | 35       | 33       |
| 94               | 470        | S1S<br>320 | 235        | 188        | 157        | 184      | 117        | 104      | 94       | 78       | 67       | . 59     | 52       | 47       | 43       | 39       | 36       | 94       |
| 98               | 490        | 320        | 240<br>245 | 192        | 160<br>163 | 137      | 120        | 107      | 96       | 80       | 69       | 60       | 53       | 48       | 44       | 40       | 37       | 95       |
| 100              | 500        | 533        | 230        | 200        | 167        | 148      | 122<br>125 | 109      | 98       | 82       | 70 71    | 62       | 54<br>56 | 50       | 45<br>45 | 41<br>42 | 38<br>38 | 36       |
| 102              | 510        | 340        | 255        | 204        | 170        | 146      | 127        | 118      | 102      | 85       | 73       | 63       | 57       | 51       | 46       | 42       | 39       | 36       |
| 104              | 520        | 947        | 260        | 208        | 173        | 149      | 130        | 116      | 104      | 87       | 74       | 65       | 58       | 52       | 47       | 43       | 40       |          |
| 106              | 530<br>540 | 353        | 265<br>270 | 212        | 177        | 151      | 132        | 118      | 106      | 88       | 76       | 66       | 59       | 53       | 48       | 44       | 41       | 58       |
| 110              | 550        | 367        | 275        | 220        | 180        | 154      | 135        | 120      | 108      | 90       | 77       | 67       | 60       | 54       | 49       | 45       | 40       | an       |
| 112              | 560        | 573        | 280        | 224        | 187        | 160      | 140        | 124      | 110      | 92       | 79<br>80 | 69<br>70 | 61 62    | 55<br>56 | 50<br>51 | 46       | 42       | 40       |
| 114              | 570        | 380        | 285        | 228        | 190        | 163      | 142        | 127      | 114      | 95       | 81       | 71       | 63       | 57       | 52       | 47       | 44       | 41       |
| 116              | 580        | 387        | 290        | 232        | 193        | 166      | 145        | 129      | 116      | 97       | 83       | 72       | 64       | 58       | 53       | 48       | 45       | 41       |
| 118              | 590        |            | 295        | 236        | 197        | 169      | 147        | 131      | 118      | 98       | 84       | 73       | 66       | 59       | 54       | 49       | 45       | 42       |
| 120              | 0001       | 400        | 2001       | 240        | 200        | 171      | 150        | 133      | 120      | 100      | 86       | 75       | 67       | 60       | 55       |          | 46       | 43       |

TABLE XL.

| Nº from  |  |  | ,<br>,   | _  | NU  | MBE  |  | rgun<br>OM   |  | BLE :  | XXX  | ix.   |  |  |  |  |   |   |
|--|--|--|--|--|---|--|--|--|--|--|--|---|--|--|--|--|---|---|
| Table  | 30   | 32   | 34   | 36.  | -38   | 40   | 45   | 50   | 55   | 60   | 70   | 80  | 90   | 100  | 1110   | 120  | 130                                       | 140   |
| 2<br>4<br>6<br>8<br>10<br>12<br>14<br>16<br>18<br>20               | 1<br>1<br>2<br>3<br>3<br>4<br>5<br>5<br>6                | 1<br>1<br>2<br>2<br>3<br>4<br>4<br>5<br>6                | 1<br>1<br>2<br>2<br>3<br>4<br>4<br>5<br>5                | 1<br>1<br>2<br>2<br>3<br>3<br>4<br>4<br>5<br>6           | 1<br>1<br>2<br>2<br>3<br>3<br>4<br>4<br>5<br>5            | 1<br>1<br>2<br>2<br>8<br>3<br>4<br>4<br>5                | 0<br>1<br>1<br>2<br>2<br>3<br>3<br>4<br>4<br>4           | 0<br>1<br>1<br>2<br>2<br>2<br>3<br>3<br>4<br>4           | 0<br>1<br>1<br>1<br>2<br>2<br>3<br>3<br>3                | 1<br>1<br>1<br>2<br>2<br>2<br>3<br>3                     | 0<br>1<br>1<br>1<br>1<br>2<br>2<br>2<br>3                | 0<br>0<br>1<br>1<br>1<br>1<br>1<br>2<br>2<br>2<br>2 | 0.<br>0<br>1<br>1<br>1<br>1<br>2<br>2<br>2     | 0<br>0<br>1<br>1<br>1<br>1<br>1<br>2<br>2      | 0<br>0<br>1<br>1<br>1<br>1<br>1<br>2<br>2      | 0 0 0 1 1 1 1 1 1 1 2                          | 0 0 0 1 1 1 1 1 1 1 2                     | 0<br>0<br>0<br>1<br>1<br>1<br>1<br>1                |
| 22<br>24<br>26<br>28<br>30<br>32<br>34<br>36<br>38<br>40           | 7<br>8<br>9<br>9<br>10<br>11<br>11<br>12<br>13<br>13     | 7<br>7<br>8<br>9<br>9<br>10<br>11<br>11<br>12<br>12      | 6<br>7<br>8<br>8<br>9<br>9<br>10<br>11<br>11<br>12       | 6<br>7<br>7<br>8<br>8<br>9<br>9<br>10<br>11              | 6<br>6<br>7<br>7<br>8<br>8<br>8<br>9<br>9                 | 6<br>6<br>7<br>7<br>8<br>8<br>9<br>9<br>10               | 5<br>5<br>6<br>6<br>7<br>7<br>8<br>8<br>8                | 4<br>5<br>5<br>6<br>6<br>6<br>7<br>7<br>8                | 4<br>4<br>5<br>5<br>5<br>6<br>6<br>7<br>7                | 4<br>4<br>4<br>5<br>5<br>5<br>6<br>6<br>6                | 3 4 4 4 5 5 5 5 6  | 3<br>3<br>3<br>4<br>4<br>4<br>4<br>5<br>5           | 2<br>3<br>3<br>3<br>4<br>4<br>4<br>4<br>4      | 2 2 3 3 3 3 4 4 4 4                            | 2 2 2 3 3 3 3 3 4                              | 2 2 2 2 3 3 3 3 3 3                            | 2 2 2 2 3 3 3 3 3 3                       | 2 2 2 2 2 2 3 3 3                                   |
| 42<br>44<br>46<br>48<br>50<br>52<br>54<br>56<br>58<br>60           | 14<br>15<br>15<br>16<br>17<br>17<br>18<br>19<br>19       | 13<br>14<br>14<br>15<br>16<br>16<br>17<br>17<br>18<br>19 | 12<br>13<br>14<br>14<br>15<br>15<br>16<br>16<br>17       | 12<br>12<br>13<br>13<br>14<br>14<br>15<br>16<br>16       | 11<br>12<br>12<br>13<br>13<br>14<br>14<br>15<br>15        | 11<br>11<br>12<br>12<br>13<br>13<br>14<br>14<br>15       | 9<br>10<br>10<br>11<br>11<br>12<br>12<br>12<br>13<br>13  | 8<br>9<br>9<br>10<br>10<br>10<br>11<br>11<br>12<br>12    | 8<br>8<br>8<br>9<br>9<br>9<br>10<br>10<br>11             | 7<br>7<br>8<br>8<br>8<br>9<br>9<br>9<br>10               | 6<br>6<br>7<br>7<br>7<br>7<br>8<br>8<br>8                | 5<br>6<br>6<br>6<br>6<br>7<br>7<br>7                | 5<br>5<br>5<br>5<br>6<br>6<br>6<br>6<br>7      | 4<br>4<br>5<br>5<br>5<br>5<br>5<br>6<br>6      | 4<br>4<br>4<br>5<br>5<br>5<br>5<br>5<br>5<br>5 | 3<br>4<br>4<br>4<br>4<br>4<br>4<br>5<br>5<br>5 | 334444445                                 | 3 3 3 4 4 4 4 4 4                                   |
| 62<br>64<br>66<br>68<br>70<br>72<br>74<br>76<br>78                 | 21<br>21<br>22<br>23<br>23<br>24<br>25<br>25<br>26<br>27 | 19<br>20<br>21<br>21<br>22<br>22<br>23<br>24<br>24<br>25 | 18<br>19<br>19<br>20<br>21<br>21<br>22<br>22<br>23<br>24 | 17<br>18<br>18<br>19<br>19<br>20<br>21<br>21<br>22<br>22 | 16<br>.17<br>17<br>18<br>18<br>19<br>19<br>20<br>21<br>21 | 16<br>16<br>17<br>17<br>18<br>18<br>19<br>19<br>20<br>20 | 14<br>14,<br>15<br>15<br>16<br>16<br>16<br>17<br>17      | 12<br>13<br>13<br>14<br>14<br>14<br>15<br>15<br>16<br>16 | 11<br>12<br>12<br>12<br>13<br>13<br>13<br>14<br>14<br>15 | 10<br>11<br>11<br>11<br>12<br>12<br>12<br>13<br>13       | 9<br>9<br>9<br>10<br>10<br>10<br>11<br>11<br>11          | 8<br>8<br>8<br>9<br>9<br>9<br>9<br>10               | 7<br>7<br>7<br>8<br>8<br>8<br>8<br>8<br>8<br>9 | 6<br>6<br>7<br>7<br>7<br>7<br>7<br>8<br>8<br>8 | 6 6 6 7 7 7 7 7                                | 5<br>5<br>5<br>6<br>6<br>6<br>6<br>6<br>6<br>7 | 5555566666                                | 4555555566  |
| 82<br>84<br>86<br>88<br>90<br>92<br>94<br>96<br>96                 | 27<br>28<br>29<br>29<br>30<br>31<br>31<br>32<br>33<br>33 | 26<br>26<br>27<br>27<br>28<br>29<br>29<br>30<br>31<br>31 | 24<br>25<br>25<br>26<br>26<br>27<br>28<br>28<br>29<br>29 | 23<br>23<br>24<br>24<br>25<br>26<br>26<br>27<br>27<br>28 | 22<br>22<br>23<br>23<br>24<br>24<br>25<br>25<br>26<br>26  | 21<br>21<br>22<br>22<br>23<br>23<br>24<br>24<br>25<br>25 | 18<br>19<br>19<br>20<br>20<br>20<br>21<br>21<br>22<br>22 | 16<br>17<br>17<br>18<br>18<br>18<br>19<br>19<br>20<br>20 | 15<br>15<br>16<br>16<br>16<br>17<br>17<br>17<br>18<br>18 | 14<br>14<br>14<br>15<br>15<br>15<br>16<br>16<br>16       | 12<br>12<br>12<br>13<br>13<br>13<br>13<br>14<br>14<br>14 | 10<br>10<br>11<br>11<br>11<br>11<br>12<br>12<br>12  | 9<br>10<br>10<br>10<br>10<br>10<br>11<br>11    | 88 9 9 9 9 9 9 10 0                            | 7<br>8<br>8<br>8<br>8<br>9<br>9<br>9           | 7 7 7 7 8 8 8 8 8                              | 6<br>7<br>7<br>7<br>7<br>7<br>8<br>8      | 6<br>6<br>6<br>6<br>6<br>7<br>7<br>7<br>7           |
| 102<br>104<br>106<br>108<br>110<br>112<br>114<br>116<br>118<br>120 | 34<br>35<br>35<br>36<br>37<br>37<br>37<br>38<br>39<br>40 | 32<br>32<br>33<br>34<br>34<br>35<br>36<br>36<br>37       | 30<br>31<br>31<br>32<br>32<br>33<br>34<br>34<br>35<br>35 | 28<br>29<br>29<br>30<br>31<br>31<br>32<br>32<br>33<br>33 | 27<br>27<br>28<br>28<br>29<br>29<br>30<br>31<br>31<br>32  | 26<br>26<br>27<br>27<br>28<br>28<br>29<br>29<br>30<br>50 | 23<br>29<br>24<br>24<br>24<br>25<br>25<br>26<br>26<br>27 | 20<br>21<br>21<br>22<br>22<br>22<br>23<br>23<br>24<br>24 | 19<br>19<br>19<br>20<br>20<br>20<br>21<br>21<br>21<br>22 | 17<br>17<br>18<br>18<br>18<br>19<br>19<br>19<br>20<br>20 | 15<br>15<br>15<br>16<br>16<br>16<br>17<br>17             | 13<br>13<br>13<br>13<br>14<br>14<br>14<br>15<br>15  | 12<br>12<br>12<br>12<br>12<br>13<br>13         | 11<br>11<br>11<br>11<br>12<br>12               | 11   | 8<br>9<br>9<br>9<br>9<br>9<br>10<br>10         | 8<br>8<br>8<br>8<br>9<br>9<br>9<br>9<br>9 | 7<br>7<br>8<br>8<br>8<br>8<br>8<br>8<br>8<br>8<br>8 |

|                |                  |                               | ٠. ٠             | 0 Drg            | REE, OR          | O Hour           |                  |                  |                  |                  |
|----------------|------------------|-------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Sec.           | . 0'             | 1'                            | - 21             | 3′               | 4′               | 5′               | 6                | 7'               | 8′               | 9'               |
| 0              |                  | 2.2553                        | 1.9542           | 1.7789           | 1.6532           | 1.5563           | 1.4771           | 1.4102           | 1.3522           | 1.3010           |
| . 1            | 4.0334           | 2.2481                        | 1.9506           | 1.7757           | 1.6514           |                  | 1.4759           | 1.4091           | 1.3513           |                  |
| 2              | 3.7324           | 2,2410                        | 1.9470           | 1.7739           | 1.6496           |                  | 1.4747           | 1.4081           | 1.3504           | 1.2994           |
| 8              | 3.5563           | 2.2341                        | 1.9435           | 1.7710           | 1.6478           |                  |                  | 1.4071<br>1.4060 | 1.3495<br>1.3486 | 1.2986<br>1.2978 |
| 4              | 3.4813           | 2.2272                        | 1.9400<br>1.9365 | 1.7686<br>1.7662 | 1.6460<br>1.6442 | 1.5491           | 1.4711           | 1.4050           |                  | 1.2970           |
| 5              | 3.3844           | 2.2205 $2.2139$               | 1.9331           | 1.7639           | 1.6425           | 1.5477           | 1.4699           |                  | 1.3468           |                  |
| 7              | 3.1883           | 2.2073                        | 1.9296           | 1.7616           | 1.6407           | 1.5463           | 1.4687           | 1.1030           | 1.3459           | 1.2954           |
| 8              | 3.1803           | 2.2009                        | 1.9262           | 1.7592           | 1.6390           |                  | 1.4676           | 1.4020           | 1.3450           | 1.2946           |
| 9              | 3.0792           | 2.1946                        | 1.9228           | 1.7570           | 1.6372           | 1.5435           | 1.4664           | 1.4010           | 1.3441           | 1.2939           |
| 10             | 3.0334           | 2.1883                        | 1.9195           | 1.7546           | 1.6355           | 1.5429           | 1.4652           | 1.3999           | 1.3432           | 1.2931           |
| 11             | 2.9920           | 2.1821                        | 1.9161           | 1.7524           | 1.6337           | 1.5406           | 1.4640           | 1.3989           | 1.3423           | 1.2925           |
| 12             | 2.9542           | 2.1761                        | 1.9128           | 1.7501           | 1.6320           | 1.5393           | 1.4629           |                  | 1.34115          | 1.2915           |
| 13             | 2.9195           | 2.1701                        | 1.9096           | 1.7478           | 1.6303<br>1.6286 | 1.5879<br>1.5865 | 1.4617<br>1.4605 | 1.3969<br>1.3959 | 1.3406           | 1.2899           |
| 14             | 2.8873           | 2.1642<br>2.1584              | 1.9063<br>1.9031 | 1.7456<br>1.743; | 1.6269           | 1.5851           | 1.4594           | 1.3939           | 1.3388           | 1.2891           |
| 15<br>16       | 2.8573<br>2.8293 | 2.1526                        | 1.8999           | 1.7411           | 1.6252           |                  | 1.4582           |                  | 1.3379           | 1.2883           |
| 17             | 2.8030           | 2.1469                        | 1.8967           | 1.7389           | 1.6235           | 1.5323           | 1.4571           | 1.3929           | 1.3370           |                  |
| 18             | 2.7782           | 2.1413                        |                  | 1.7368           | 1.6218           | 1.5310           | 1.4559           | 1.3919           | 1.3362           | 1.2868           |
| 19             | 2.7546           | 2,1858                        | 1.8904           | 1.7345           | 1.6201           | 1.5296           | 1.4548           | 1.3909           | 1.3358           | 1.2860           |
| 20             | 2.7324           | 2.1303                        | 1.8873           | 1.7324           | 1.6184           | 1.5283           | 1.4536           | 1.3899           | 1.3344           | 1.2852           |
| 21             | 2.7112           | 2.1249                        |                  | 1.7302           | 1.6168           | 1.5269           | 1.4525           | 1.3890           | 1:3336           | 1.2845           |
| 29             | 2.6910           | 2.1196                        | 1.8811           | 1.7281           | 1.6151           | 1.5255           | 1.4513           | 1.3880           | 1.3327           | 1.2837           |
| 23             | 2.6717           | 2.1143                        |                  | 1.7259           | 1.6134           | 1.5242           | 1.4502<br>1.4491 | 1.3870           | 1.3318           | - 0001           |
| 24             | 2.6532<br>2.6355 | 2.1091<br>2.1040              | I                | 1.7288 $1.7216$  | 1.6118           | 1.5215           | 1.4479           | 1.3850           | 1.3301           | 1.2814           |
| 25<br>26       | 2.6184           | 2.0989                        |                  | 1.7195           | 1.6085           | 1.5202           | 1.4468           | 1.3841           | 1.3298           |                  |
| 27             | 2.6021           | 2.0939                        | 1.8661           | 1.7175           | 1.6069           | 1.5189           | 1.4457           | 1.3831           | 1.3284           | 1.2798           |
| . 28           | 2.5862           | 2.0889                        | 1.8631           | 1.7153           | 1.6053           | 1.5175           | 1.4446           | 1.3821           | 1.3275           | 1.2791           |
| 29             | 2.5710           | 2.0840                        | 1.8602           | 1.7138           | 1.6037           | 1.5162           | 1.4495           | 1.3812           | 1.3267           | 1.2783           |
| 30             | 2.5563           | 2.0792                        | 1.8573           | 1.7112           | 1.6021           | 1.5149           | 1.4424           | 1.3802           | 1.3259           | 1.2775           |
| 31             | 2.5420           | 2,0744                        | 1.8544           | 1.7091           | 1.6004           | 1.5136           | 1.4412           | 1.3792           | 1.3250           | 1.2768           |
| 32             | 2.5283           | 2.0696                        | 1.8516           | 1.7071           | 1.5988           | 1.5123           | 1.4401           | 1.3783           | 1.5241           | 1.2753           |
| 33             | 2.5149           | 2.0649                        | 1.8487<br>1.8459 | 1.7050<br>1.7030 | 1.5973<br>1.5957 | 1.5110           | 1.4390<br>1.4379 | 1.3773<br>1.3763 | 1.3233           | 1.2745           |
| 34<br>35       | 2 5019<br>2.4893 | 2.0603<br>2.0557              | 1.8431           | 1.7010           | 1.5941           | 1.5084           | 1.4368           | 1.3754           | 1.3216           | 1.2737           |
| 86             | 2.4771           | 2,0512                        | 1.8405           | 1.6990           | 1.5925           | 1.5071           | 1.4357           | 1.3745           | 1.3208           | 1.2730           |
| · 57           | 2.4652           | 2.0466                        | 1.8375           | 1.6969           | 1.5909           | 1.5058           | 1.4346           | 1.3735           | 1.3199           | 1.2722           |
| 38             | 2.4536           | 2.0422                        | 1.8347           | 1.6949           | 1.5894           | 1.5045           | 1.4835           | 1.3725           | 1.3191           | 1.2707           |
| 39             | 2.4424           | 2.0378                        | 1.8520           | 1,6930           | 1.5878           | 1.5032           | 1.4325           | 1.3716           |                  |                  |
| 40 .           | 2.4313           | 2.0334                        | 1.8293           | 1.6910           | 1.5862           | 1.5019           | 1 /4313          | 1.3706           | 1.3174           | 1.2700<br>1.2692 |
| 41             | 2.4206           | 2.0291                        | 1.8266           | 1.6890           | 1.5847           | 1.5006<br>1.4994 | 1 4303           | 1.3697           | 1.3166<br>1.3158 | 1.2685           |
| 42             | 2.4102           | 2.0 <del>24</del> 8<br>2.0206 | 1.8239<br>1.8212 | 1.6871<br>1.6851 | 1.5832<br>1.5816 | 1.4981           | 1.4592<br>1.4281 | 1.3688           | 1.3149           | 1.2677           |
| 45             | 2.3909<br>2.3809 | 2.0164                        | 1.8186           | 1.6832           | 1.5801           | 1.4968           | 1.4270           | 1.8669           | 1,3141           | 1.2670           |
| 45             | 2.3802           | 2.0122                        | 1.8159           | 1.6812           | 1.5786           | 1.4956           | 1.4260           | 1.3660           | 1.3133           | 1.2663           |
| 46             | 2.3706           | 2.0081                        | 1.8138           | 1.6793           | 1.5770           | 1.4943           | 1.4249           | 1.3650           | 1.3124           | 1.2655           |
| 47             |                  | 2.0040                        |                  | 1.6774           | 1.5755           | 1.4931           | 1.4238           | 1.3641           | 1.3116           | 1.2640           |
| 48             | 2.3522           | 2.0000<br>1.9960              | 1.8081<br>1.8055 | 1.6755<br>1.6736 | 1.5740           | 1,4918           | 1.4228<br>1.4217 | 1.3632           | 1.3099           | 1.2633           |
| 49:            | 8.3432           |                               |                  |                  |                  |                  |                  |                  |                  | 1.2626           |
| . 50           | 2.3344           |                               | 178030           | 1.6717           | 1.5710           | 1:4893           | 1.4206           | 1.3613           | 1.3091<br>1.3083 |                  |
| 51             |                  | 1.9881                        |                  | 1.6698           |                  | 1,4881           | 1.4196           | 1.3604           | 1.3063           | 1.2611           |
| 52<br>53       | 2.3091           |                               |                  |                  |                  | 1.4856           |                  | 1.3585           | 1.3067           | 1.2603           |
| 54             | 2.3010           |                               | 1.7929           |                  | 1.5651           |                  |                  | 1.3576           | 1.3059           | 1.2596           |
| 55             | 2.2930           | 1.9727                        | 1.7904           | 1.6623           | 1.5636           | 1,4832           | 1.4154           | 1.8567           | 1.3050           | 1.2589<br>1.2582 |
| 56             | 2.2852           | 1.9689                        | 1.7879           | 1.6605           | 1.5621           |                  | 1.4143           | 1.3558           | 1.3042           | 1.2574           |
| 57             | 2.2775           | 1.9652                        | 1.7855           | 1.6587<br>1.6568 | 1.5607           | 1.4808           |                  | 1.3549           | 1.3034           | 1.2567           |
| . 58·<br>. 59· | 2.2700<br>2.2626 | 1.9615                        | 1.7830           | 1.6550           |                  | 1.4783           |                  | 1.3531           | 1.3018           | 1.2560           |
| +              |                  |                               |                  |                  | 4/               |                  |                  |                  |                  | 9'               |
|                | ή,               | 1/                            | 21               | 3'               | - 4/             | 5'               | 6'               | 7'               | 8/ 1             |                  |

## TABLE XLI. PROPORTIONAL LOGARITHMS.

|            |                  |        |        | 0 Dr             | GREE, O | R O Ho | UR.              |        |                      |              |                        |
|------------|------------------|--------|--------|------------------|---------|--------|------------------|--------|----------------------|--------------|------------------------|
| Sec.       | 10'              | 11'    | 12'    | 13'              | 14      | 15'    | 16'              | 17'    | 18'                  | 19'          | 20′                    |
| 0          | 1.255            | 1.2139 | 1.1761 | 1.1419           | 1.1091  | 1.0792 | 1.0512           | 1.0248 | 1.0000               | 9765         | 9542                   |
| 1          | 1.2545           | 1.2132 | 1.1755 |                  | 1.1086  |        | 1.0507           | 1.0244 | 9996                 | 9761         | 9539                   |
| 2          | 1.2538           | 1.2125 |        | 1.1402           |         |        |                  | 1.0240 | 9992                 | 9757         | 9535                   |
| 3          | 1.2531           | 1.2119 |        | 1.1397           |         |        | 1.0498           | 1.0235 | 9988                 | 9754         | 9532                   |
| 5          | 1.2524           | 1.2112 | 1.1737 | 1.1391<br>1.1385 |         |        | 1.0493<br>1.0489 | 1.0231 | 9984                 | 9750<br>9746 | 9 <b>528</b><br>9524 · |
| 6          | 1.2517           |        | 1.1725 |                  |         | 1.0763 |                  | 1.0223 | 9980<br>9976         | 9742         | 9521                   |
| 7          | 1.2502           | 1.2093 |        | 1.1374           |         |        | 1.0480           | 1.0218 | 9972                 | 9738         | 9517                   |
| 8          | 1.2495           | 1.2086 |        | 1.1369           |         |        |                  | 1.0214 | 9968                 | 9735         | 9513                   |
| 9          | 1.2488           |        |        | 1.1563           |         |        | 1.0471           | 1.0210 | 9964                 | 9731         | 9510                   |
| 10         | 1.2481           | 1.2073 | 1.1701 | 1.1358           | 1.1040  | 1.0744 | 1.0466           | 1.0206 | 9960                 | 9727         | 9506                   |
| 11         | 1.2474           | 1.2067 |        |                  | 1.1035  |        | 1.0462           | 1.0201 | 9956                 | 9723         | 9503                   |
| 12         | 1.2467           | 1.2061 |        | 1.1347           |         |        | 1.0458           |        | 9952                 | 9720         | 9499                   |
| 13         | 1.2459           | 1.2054 |        |                  | 1.1025  |        |                  | 1.0193 | 9948                 | 9716         | 9495                   |
| 14         | 1.2452           | 1.2067 |        | 1.1336           | 1.1020  |        | 1.0448           |        | 994 <b>4</b><br>9940 | 9712<br>9708 | 9492<br>9488           |
| 16         | 1.2438           | 1.2035 |        |                  | 1.1009  |        |                  |        |                      | 9704         | 9485                   |
| 17         | 1.2431           |        |        |                  | 1.1003  |        | 1.0435           |        | 9932                 | 9701         | 9481                   |
| 18         | 1.2424           |        | 1.1654 |                  | 1.0999  |        | 1.0431           | 1.0172 | 9928                 | 9697         | 9478                   |
| 19         | 1.2417           | 1.2015 |        |                  | 1.0994  |        |                  |        | 9924                 | 9693         | 9474                   |
| 20         |                  | 1.2009 |        |                  | 1.0989  |        |                  | 1.0164 | 9920                 | 9689         | 9470                   |
| 21         | 1.2403           |        |        | 1.1296           |         | 1.0692 |                  |        |                      | 9686         | 9467                   |
| 22         | 1.2396           |        |        |                  | 1.0979  |        |                  | 1.0155 | 9912                 | 9682         | 9463                   |
| 23         | 1.2389           |        |        |                  | 1.0974  |        |                  |        | 9908                 | 9678         | 9460                   |
| 24<br>25   | 1.2382           |        |        |                  | 1.0969  |        |                  |        |                      | 9675         | 9456                   |
| 26         | 1.2368           |        |        | 1.1270           | 1.0964  |        | 1.0395           |        | 9901<br>9897         | 9671<br>9667 | 9453<br>9449           |
| 27         | 1.2362           | 1.1965 | 1.1601 |                  | 1.0954  |        |                  |        |                      | 9664         | 9446                   |
| 28         | 1.2355           | 1.1958 | 1.1595 |                  | 1.0949  |        |                  |        |                      | 9660         | 9442                   |
| 29         | 1.2348           |        |        | 1.1255           |         | 1.0654 |                  |        |                      | 9656         | 9439                   |
| 30         | 1.2341           | 1.1946 | 1.1584 | 1.1249           | 1.0939  | 1.0649 | 1.0378           | 1.0122 | 9881                 | 9652         | 9435                   |
| 31         | 1.2334           |        |        | 1.1244           |         | 1.0645 |                  |        |                      | 9648         | 9431                   |
| 32         | 1.2327           |        |        | 1.1238           |         |        |                  |        |                      | 9645         | 9428                   |
| 33<br>34   | 1.2320           |        |        | 1.1233           |         | 1.0635 |                  |        |                      | 9641         | 9425<br>9421           |
| 35         | 1.2313<br>1.2306 |        | 1.1555 | 1.1228           |         | 1.0631 |                  |        |                      | 9637<br>9634 | 9417                   |
| 36         | 1,2300           |        |        | 1.1217           |         | 1.0621 |                  |        |                      | 9630         | 9414                   |
| 37         | 1.2293           |        | 1.1543 |                  |         | 1.0617 |                  | 1.0093 |                      | 9626         | 9410                   |
| 38         | 1.2286           |        |        | 1.1206           |         | 1.0612 |                  |        | 1 .                  | 9623         | 9407                   |
| 39         | 1.2279           | 1.1889 | 1,1532 | 1.1201           | 1.0894  | 1.0608 | 1.0339           | 1.0085 | 9846                 | 9619         | 9404                   |
| 40         | 1.2272           |        | 1.1526 |                  | 1.0889  |        |                  | 1.0081 | 9842                 | 9615         | 9400                   |
| 41         | 1.2265           |        |        |                  | 1.0884  |        |                  |        |                      | 9612         | 9996                   |
| 42         | 1.2259           |        |        |                  | 1.0880  |        |                  |        |                      | 9608         | 9393                   |
| 43<br>44   | 1.2252           |        |        | 1.1180           |         | 1.0589 |                  | 1.0069 |                      | 9604         | 9389                   |
| 45         | 1.2245           |        |        |                  | 1.0870  |        |                  |        |                      | 9601         | 9388                   |
| 46         | 1.2239           |        |        |                  | 1.0865  |        |                  |        |                      | 9593         | 9379                   |
| 47         | 1.2225           |        |        |                  | 1.0855  |        |                  |        |                      | 9590         | 9375                   |
| 48         | 1.2218           | 1.1894 |        |                  | 1.0850  |        |                  |        | T                    | 9586         | 9372                   |
| 49         | 1.2212           |        |        |                  | 1.0845  |        |                  |        |                      | 9582         | 9368                   |
| 50         |                  | 1.1822 |        |                  |         |        |                  |        |                      |              | 9365                   |
| 51         |                  | 1.1816 |        |                  |         |        |                  | 1.0036 |                      | 9575         | 9362                   |
| 52<br>50   |                  | 1 1809 |        |                  |         |        |                  | 1.0032 |                      | 9571         | 9358                   |
| 53<br>54   | 1.2185           |        |        |                  | 1.0826  |        |                  | 1.0028 |                      | 9568         | 9355                   |
| 55         |                  | 1.1797 |        |                  |         | 1.0539 |                  | 1.0024 |                      | 9564<br>9560 | 9331                   |
| 56         | 1.2172           |        |        |                  | 1.0816  | 1.0594 |                  | 1.0020 |                      | 9557         | 9344                   |
| 57         |                  | 1.1779 |        |                  |         | 1.0525 |                  | 1.0012 |                      | 9553         | 9341                   |
| <i>5</i> 8 | 1.2152           | 1.1773 | 1.1424 | 1.1102           | 1.0801  | 1.0520 | 1.0257           |        |                      | 9549         | 9337                   |
| 59         |                  | 1.1767 |        |                  |         |        |                  | 1.0004 |                      | 9546         | 9334                   |
|            | 10'              | 11'    | 12'    | 13               | 14'     | 15'    | 16'              | 17'    | 18'                  | 19'          | 20′                    |

TABLE XLI.
PROPORTIONAL LOGARITHMS.

|              |              |              | <del></del>   | ,                    | O DE                           | GREE,        | or O I       | Hour.                |              |              |                                | •            |              |
|--------------|--------------|--------------|---------------|----------------------|--------------------------------|--------------|--------------|----------------------|--------------|--------------|--------------------------------|--------------|--------------|
| Sec.         | 21'          | 22'          | 23'           | 24                   | 25'                            | 26′          | 27′          | 28′                  | . 29′        | 80′          | 31'                            | 32'          | 33′          |
| 0            | 9331         | 9128         | 8935          | 8751                 | 8573                           | 8403         | 8239         | 8081                 | 7929         | 7782         | 7639                           | 7501         | 7368         |
| 1            | 9327         | 9125         | 8932          | 8748                 | 8570                           | 8400         | 8236         | 8078                 | 7926         | 7779         | 7637                           | 7499         | 7365         |
| 2            | 9323         | 9122         | 8929          | 8745                 | 8567                           | 8397         | 8234         | 8076                 | 7924         | 7776         | 7634                           | 7496         | 7363         |
| . 3          | 9320         | 9119         | 8926          | 8742                 | 8 <i>5</i> 6 <i>5</i>          | 8395         | 8231         | 8073                 | 7921         | 7774         | 7632                           | 7494         | 7361         |
| 4            | 9317         | 9115         | 8923          | 8739                 | 8562                           | 8392         | 8228         | 8071                 | 7919         | 7772         | 7630                           | 7492         | 7359         |
| 5            | 9313         | 9112         | 8920          | 8736                 | 8559                           | 8389         | 8225         | 8068                 | 7916         | 7769         | 7627                           | 7490         | 7356         |
| 6            | 9310         | 9109         | 8917          | 8733                 | 8556                           | 8386         | 8223         | 8066                 | 7914         | 7767         | 7625                           | 7488         | 7854         |
| 7            | 9306         | 9105         | 8913          | <b>\$</b> 730        | 8553                           | 8383         | 8220         | 8063                 | 7911         | 7764         | 7623                           | 7485         | 7352         |
| 8            | 9303         | 9102         | 8910          | 8727                 | 8550                           | 8381         | 8217         | 8060                 | 7909         | 7762         | 7620                           | 7483         | 7950         |
|              | 9300         | 9099         | 8907          | 8724                 | 8547                           | 8378         | 8215         | 80.18                | 7906         | 7760         | 7618                           | 7481         | 7348         |
| 10           | 9296         | 9096         | 8904          | 8721                 | 8544                           | 8375         | 8212         | 8055                 | 7904         | 7757         | 7616                           | 7478         | 7945         |
| 11           | 9293         | 9092         | 8901          | 8718                 | 8541                           | 8379         | 8209         | 8053                 | 7901         | 7755         | 7613                           | 7476         | 7343         |
| 12           | 9289         | 9089         | 8898          | 8715                 | 8539                           | 8370         | 8207         | 8050                 | 7899         | 7753         | 7611                           | 7474         | 7341         |
| 13 ,<br>14 , | 9286<br>9282 | 9082         | 8895<br>8891  | 8712                 | 8536                           | 8367         | 8204         | 8047                 | 7896         | 7750         | 7609                           | 7472         | 7339<br>7337 |
| 15           | 9279         | 9079         | 8888          | 8709<br>8706         | 8533                           | 8364<br>8361 | 8202         | 8045<br>8043         | 7894<br>7891 | 7748<br>7745 | 7606<br>7604                   | 7467         | 7335         |
| 16           | 9276         | 9076         | 8885          | 8703                 | 8 <i>5</i> 30<br>8 <i>5</i> 27 | 8358         | 8199<br>8196 | 8040                 | 7889         | 7743         | 7602                           | 7465         | 7332         |
| 17           | 9272         | 9073         | 8882          | 8700                 | 8524                           | 8356         | 8194         | 8037                 | 7886         | 7740         | 7599                           | 7463         | 7330         |
| 18           | 9269         | 9070         | 8879          | 8697                 | 8522                           | 8353         | 8191         | 8035                 | 7884         | 7738         | 7597                           | 7461         | 7328         |
| 19           | 9265         | 9066         | 8876          | 8694                 | 8519                           | 8350         | 8188         | 8032                 | 7881.        | 7736         | 7595                           | 7458         | 7326         |
| 20           | 9262         | 9063         | 8873          | 8691                 | 8516                           | 8347         | 8186         | 8030                 | 7879         | 7733         | 7592                           | 7456         | 7324         |
| 21           | 9259         | 9060         | 8870          | 8688                 | 8513                           | 8345         | 8183         | 8027                 | 7877         | 7731         | 7590                           | 7454         | 7322         |
| 22           | 9255         | 9056         | 8867          | 8685                 | 8510                           | 8342         | 8180         | 8025                 | 7874         | 7729         | 7 <i>5</i> 88                  | 7452         | 7319         |
| 23           | 9252         | 9053         | 8864          | 8682                 | 8507                           | 8339         | 8178         | 8022                 | 7872         | 7726         | 7586                           | 7449         | 7317         |
| 24           | 9249         | 9050         | 8861          | 8679                 | 8504                           | 8337         | 8175         | 8020                 | .7869        | 7724         | <i>75</i> 83                   | 7447         | 7315         |
| 25           | 9245         | 9047         | 8857          | 8676                 | 8501                           | 8334         | 8172         | 8017                 | 7867         | 7721         | 7581                           | 7445         | 7313         |
| 26<br>27     | 9242<br>9238 | 9044         | 8854          | 8673                 | 8498                           | 8331         | 8170         | 8014                 | 7864         | 7719         | 7579                           | 7443         | 7311         |
| 28           | 9235         | 9041<br>9037 | 8851<br>8848  | 8670                 | 8496                           | 8328         | 8167         | 8012                 | 7862         | 7717         | 7577                           | 7441         | 7309         |
| <b>2</b> 9   | 9231         | 9034         | 8845          | 8667<br>8664         | 8493<br>8490                   | 8326<br>8323 | 8164<br>8162 | 8009<br>8007         | 7859<br>7857 | 7714<br>7712 | 7574<br>7572                   | 7438<br>7436 | 7304         |
| 50           | 9228         | 9031         | 8842          | 8661                 | 8487                           | 8320         | 8159         | 8004                 | 7855         | 7710         | 7570                           | 7434         | 7302         |
| 31           | 9225         | 9027         | 8839          | 8658                 | 8484                           | 8317         | 8157         | 8002                 | 7852         | 7707         | 7567                           | 7431         | 7300         |
| 32           | 9221         | 9024         | 8836          | 8655                 | 8481                           | 8315         | 8154         | 7999                 | 7849         | 7705         | 7565                           | 7429         | 7298         |
| 35           | 9218         | 9021         | 8833          | 8652                 | 8479                           | 8312         | 8152         | 7997                 | 7847         | 7703         | 7563                           | 7427         | 7296         |
| : 3 <b>4</b> | 9215         | 9018         | 8830          | 8649                 | 8476                           | 8309         | 8149         | 7994                 | 7844         | 7700         | 7560                           | 7425         | 7298         |
| 35 \         | 9211         | 9015         | 8827          | 8646                 | 8473                           | 8306         | 8146         | 7991                 | 7842         | 7698         | 7558                           | 7423         | 7291         |
| 36           | 9208         | 9012         | 8824          | 8643                 | 8470                           | 8304         | 8144         | 7989                 | 7840         | 7696         | 7556                           | 7421         | 7289         |
| 37 -         | 9205         | 9008         | 8820          | 8640                 | 8467                           | 8301         | 8141         | 7986                 | 7837         | 7693         | 7553                           | 7418         | 7287         |
| 38           | 9201         | 9005         | 8817          | 8637                 | 8464                           | 8298         | 8138         | 7984                 | 7835         | 7691         | 7551                           | 7416         | 7285         |
| 39           | 9198         | 9002         | 8814          | 8635                 | 8462                           | 8296         | 8136         | 7981                 | 7832         | 7688         | 7549                           | 7414         | 7283         |
| 40           | 9195         | 8999         | 8811          | 8632                 | 8459                           | 8293         | 8133         | 7979                 | 7830         | 7686         | 7546                           | 7411         | 7281         |
| 41           | 9191         | 8995         | '8808         | 8629                 | 8456                           | 8290         | 8130         | 7976                 | 7827         | 7683         | 7544                           | 7409         | 7278         |
| 42           | 9188         | 8992         | 8805          | 8626                 | 8453                           | 8288         | 8128         | 7974                 | 7825         | 7681         | 7542                           | 7407         | :7276        |
| 48           | 9185         | 8989         | 8802          | 8623                 | 8450                           | 8285         | 8125         | 7971                 | 7823         | 7679         | 7540                           | 7405         | 7274<br>7272 |
| 44<br>45     | 9181<br>9178 | 8986<br>8983 | 8799          | 8620                 | 8448                           | 8282         | 8122         | 7969                 | 7820         | 7676         | 7537                           | 7403         | 7270         |
| 45<br>46     | 9175         | 8980         | 8796<br>8793  | 8617                 | 8445                           | 8279         | 8120         | 7966<br>796 <b>4</b> | 7818         | 7674         | 7535                           | 7401<br>7398 | 7268         |
| 47           | 9171         | 8976         | 8790          | 8614<br>8611         | 8442<br>8439                   | 8277<br>8274 | 8117         | 7961                 | 7815<br>7813 | 7672<br>7669 | 7533<br>7531                   | 7396         | 7266         |
| 48           | 9168         | 8973         | 8787          | 8608                 | 8437                           | 8271         | 8115<br>8112 | 7959                 | 7811         | 7667         | 7528                           | 7394         | 7264         |
| 49           | 9165         | 8970         | 8784          | 8605                 | 8434                           | 8268         | 8109         | 7956                 | 7808.        | 7665         | 7526                           | 7392         | 7261         |
| 50           | 9161         | 8967         | 8781          | 8602                 | 8431                           | 8266         | 8107         | 79.54                | 7805         | 7662         | 7524                           | 7389         | 7259         |
| 51           | 9158         | 8964         | 8778          | 8599                 | 8428                           | 8263         | 8104         | 7951                 | 7803         | 7660         | 7522                           | 7387         | 7257         |
| 52           | 9155         | 8960         | 8775          | 8596                 | 8425                           | 8260         | 8102         | 7949                 | 7801         | 7658         | 7519                           | 7585         | 7255         |
| 53           | 9151         | 8957         | 8772          | 8593                 | 8422                           | 8258         | .8099.       | 7946                 | 7798         | 7635         | 7517                           | 7383         | 7253         |
| 54           | 9148         | 8954         | 8769          | 8591                 | 8420                           | 8255         | 8097         | 7944                 | 7796         | 7653         | 7515                           | 7381         | 7251         |
| 55           | 9145         | 8951         | 8766          | 8588                 | 8417                           | 8252         | 8094         | 7941                 | 7793         | 7651         | 7512                           | 7378         | 7248         |
| 56           | 9141         | 8948         | 8763          | 8585                 | 8414                           | 8250         | 8091         | 7939                 | 7791         | 7648         | 7510                           | 7376         | 7246         |
| 57           | 9138         | 8945         | 8760          | 8582                 | 8411                           | 8247         | 8089         | 7936                 | .7789        | 7646         | 7508                           | 7374         | 7244         |
| 58<br>59     | 9135<br>9132 | 8942<br>8938 | 8757_<br>8754 | <i>85</i> 79<br>8576 | 8408<br>8406                   | 8244<br>8242 | 8086<br>8084 | 7934<br>7931         | 7786<br>7784 | 7644<br>7641 | 7 <i>5</i> 06<br>7 <i>5</i> 03 | 7372<br>7370 | 7242<br>7240 |
|              | 211          | 22'          |               | 24                   |                                |              |              |                      |              |              |                                | 32'          | 39'          |
|              | 41           | · 22'        | 23'           | 24'                  | 25'                            | 26'          | 27'          | 28′                  | 29/          | 30/          | 31'                            | 32           | 33           |

TABLE XLI.

| 1   7296   7110   6988   6869   6753   6640   6530   6429   6817   6214   6115   6017   5922   5927   7104   6986   6867   6747   6635   6625   6418   6811   6901   6927   6928   6418   6817   6921   6111   6014   5918   5927   7102   6980   6861   6747   6635   6625   6418   6811   6901   6911   6114   5014   5918   5927   7102   6980   6861   6745   6683   6625   6418   6811   6901   6901   6901   6907   690   | ı   |             | <del></del> |      |      |      | O Dr | OPEE  | 0 P O 1 | House |      |      |             |      |               |
|--|-----|-------------|-------------|------|------|------|------|-------|---------|-------|------|------|-------------|------|---------------|
| 1   7296   7110   6988   6869   6753   6640   6530   6429   6817   6214   6115   6017   5922   5927   7104   6986   6867   6747   6635   6625   6418   6811   6901   6927   6928   6418   6817   6921   6111   6014   5918   5927   7102   6980   6861   6747   6635   6625   6418   6811   6901   6911   6114   5014   5918   5927   7102   6980   6861   6745   6683   6625   6418   6811   6901   6901   6901   6907   690   | l   | Sec.        | 34'         | 35'  | 36′  | 37/  |      |       |         |       | 42'  | 49'  | 44'         | 45'  | 46/           |
| 2  | ۱   |             | 7238        |      |      |      | 6755 |       |         |       |      |      |             |      | 5925          |
| 3         7322         7106         6984         6665         6749         6637         6627         6420         6811         6911         611         6014         5912         5         7227         7102         6980         6661         6745         6638         6623         6414         6810         6901         6901         6911         5911         611         6011         5912         655         7474         6638         6229         6414         6810         6901         6901         6901         6915         6912         6913         6914         6910         6805         6738         6625         6613         6414         6810         6800         6606         6600         6506         6627         6617         6611         6600         6500         6620         6620         6620         6620         6620         6620         6610         6609         6620 <th>I</th> <th></th> <th>5923</th>   | I   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5923          |
| 4 7229 7104 6982 6863 6747 6683 6825 6418 6313 6211 6111 6012 5911 6 7225 7100 6978 6859 6745 6683 6221 6414 6310 6208 6108 6011 5911 6 7225 7100 6978 6859 6745 6683 6221 6414 6310 6208 6208 6108 6011 5911 6 722 722 722 722 722 722 722 722 722 7  | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5920          |
| 6 7925 7100 6978 6855 6748 6881 6521 6414 6810 6308 6306 6106 6009 5911 8 7221 7095 6974 6855 6739 6627 6517 6411 6306 6304 6105 6009 5911 6100 1091 6791 6791 6793 6972 6855 6739 6627 6517 6411 6306 6304 6105 6008 5911 1 7214 7089 6968 6846 6734 6621 6512 6405 6301 6499 6400 6003 5911 1 7214 7089 6968 6847 6732 6623 6516 4607 6303 6001 6109 6000 5911 1 7214 7089 6968 6847 6732 6621 6512 6405 6301 6499 6400 6003 5901 12 7212 7087 6966 6847 6732 6623 6510 640 5300 6198 6009 6001 5901 12 7212 7087 6966 6847 6732 6601 6502 6301 6499 6400 6003 5901 12 7210 7085 6964 6845 6779 6618 6308 6402 2388 6196 4097 6400 1590 1590 1590 1590 1590 1590 1590 15   | ı   |             | 7229        |      | 6982 | 6863 |      | 6635  |         |       |      |      |             |      | <b>5</b> 919  |
| 7 7929 7067 8976 6857 6741 6629 6519 6412 6808 6906 6106 6009 5511 9 7219 7098 6972 6853 6738 6625 6516 6409 6305 6203 6105 6008 5511 10 7216 7091 6970 6851 6736 6625 6516 6409 6305 6203 6103 6006 5511 11 7214 7089 5968 6849 6734 6621 6512 6405 6301 6199 6400 6004 5901 12 7212 7087 6966 6847 6732 6620 6510 6404 6300 6198 6009 6901 5901 13 7210 7085 6966 6844 6736 6610 6508 6402 6308 6198 6009 6901 5901 14 7204 7089 5966 6844 6728 6616 6508 6402 6308 6198 6009 6901 5901 15 7206 7081 6966 6844 6728 6616 6507 6400 6966 6194 6095 6998 5902 16 7204 7079 6958 6889 6724 6612 6505 6398 6994 6193 6094 5997 5902 17 7202 7077 6956 6837 6722 6610 6501 6395 6397 6293 6191 6092 5995 5902 17 7202 7077 6956 6837 6722 6610 6501 6395 6397 6293 6191 6092 5995 5902 18 7200 7075 6956 6837 6722 6610 6501 6395 6397 6393 6391 6189 6093 5993 5891 18 7200 7075 6956 6837 6722 6610 6501 6395 6397 6393 6391 6189 6093 5993 5891 19 7197 7075 6956 6837 6722 6610 6501 6395 6395 6395 6389 6188 6088 5992 5892 20 7195 7071 6956 6837 6725 6610 6501 6498 6391 6387 6186 6087 5990 5892 22 7191 7067 6946 6326 6715 6603 6494 6388 6384 6183 6084 5997 5892 22 7191 7067 6946 6326 6715 6603 6494 6388 6384 6183 6084 5997 5892 22 7191 7067 6946 6326 6715 6603 6494 6388 6384 6183 6084 5997 5892 22 7191 7067 6946 6328 6715 6603 6494 6388 6384 6183 6084 5997 5892 23 7189 7065 6944 6326 6715 6603 6494 6388 6384 6183 6084 5997 5892 24 7187 7062 6904 6822 6707 6596 6489 6381 6179 6085 5988 5898 24 7187 7063 6946 6822 6707 6596 6489 6383 6379 6178 80079 5892 25 71465 7061 6940 6822 6706 6596 6489 6383 6379 6178 80079 5892 25 71465 7061 6940 6822 6706 6596 6489 6383 6379 6178 80079 5892 25 71465 7061 6940 6822 6706 6596 6489 6383 6479 6178 80079 5892 25 71467 7064 6939 6816 6709 6596 6484 6379 6257 6166 6007 5971 5976 5881 25 71467 7064 6939 6810 6696 6585 6446 6385 6494 6496 6595 6496 6496 6395 6496 6496 6496 6496 6496 6496 6496 64   | l   |             |             |      |      |      |      |       |         |       |      |      | -           |      |               |
| 8 7221 7095 8974 8655 6739 6627 6517 6411 6306 6304 6105 6008 5911 9719 7098 8972 6853 6738 6625 6514 6407 6303 6201 6102 6004 5900 11 7216 7089 8968 6449 6734 6621 6512 6405 6301 6199 6100 6003 5900 112 7212 7087 8966 6847 6732 6620 610 6404 6300 6198 6009 9601 13 7210 7085 8964 6845 6739 6618 6508 6402 6308 6196 4007 6000 5900 113 7210 7085 8964 6845 6730 6618 6508 6402 6398 6196 4007 6000 5900 115 7206 7081 8960 6841 6726 6614 6505 6398 6394 6193 6004 5900 116 7206 7081 8960 6841 6726 6614 6505 6398 6394 6193 6094 5997 5900 116 7200 7077 6956 6837 6722 6610 6300 6398 6394 6193 6094 5995 5900 117 7207 7073 6956 6837 6722 6610 6306 6300 6398 6391 6189 6090 5993 5809 118 7200 7075 6956 6837 6722 6610 6305 6398 6393 6191 6092 5995 5900 118 7200 7075 6956 6837 6721 6605 6300 6393 6393 6393 6188 6089 5992 6834 6119 7197 7073 6956 6837 6712 6600 6300 6393 6389 6188 6089 5992 6891 19 7197 7073 6956 6837 6715 6603 6390 6393 6389 6188 6089 5992 6891 19 7197 7073 6956 6834 6715 6600 6300 6393 6389 6188 6089 5992 6892 22 7191 7067 6946 6828 6715 6600 6300 6393 6388 6384 6183 6084 5987 5893 6333 7189 70655 6944 6828 6715 6600 6496 6398 6391 6189 6087 5990 5891 6391 6392 6391 6391 6392 6391 6391 6392 6391 6392 6391 6392 6391 6392 6391 6392 6391 6392 6391 6392 6391 6392 6391 6392 6391 6392 6391 6392 6391 6392 6391 6392 6392 6391 6392 6392 6392 6392 6392 6392 6392 6392   | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      | <i>5</i> 914  |
| 10   | ı   |             |             | 7095 |      |      |      |       |         |       | 6306 | 6204 | 6105        | 6008 | 5912          |
| 11   | ı   | 9           | 7219        | 7098 | 6972 | 6853 | 6738 | 6625  | 6516    | 6409  | 6305 | 6203 | 6103        | 6006 | 5911          |
| 12   7212   7087   6966   6847   6739   6630   6510   6404   6300   6198   6099   6901   5900     13   7210   7085   6964   6845   6730   6618   6508   6402   6398   6196   6409   5990     15   7206   7081   6960   6841   6726   6614   6505   6398   6394   6193   6094   5997   5901     16   7204   7079   6956   6887   6722   6610   6501   6395   6299   6194   6092   5995   5901     17   7202   7077   6956   6887   6722   6610   6501   6395   6299   6189   6099   5995   5901     18   7200   7075   6956   6887   6722   6610   6501   6395   6299   6188   6089   5995   5891     19   7197   7073   6952   6834   6719   6607   6498   6391   6287   6186   6087   5990   5891     20   7195   7071   6950   6832   6713   6603   6494   6388   6384   6385   6084   5985     21   7193   7069   6948   6830   6715   6603   6494   6388   6284   6183   6084   5985     22   7191   7067   6946   6826   6711   6599   6490   6384   6281   6179   6080   5985     23   7188   7063   6942   6884   6713   6603   6494   6388   6284   6183   6084   5985     24   7181   7063   6942   6884   6703   6396   6487   6381   6277   6178   6079   5982   5889     25   71485   7061   6940   6822   6707   6596   6487   6381   6277   6178   6079   5982   5889     25   71485   7061   6940   6822   6707   6596   6487   6381   6277   6178   6079   5982   5889     27   7181   7057   6936   6818   6704   6592   6484   6877   6275   6174   6075   5979   5881     28   7179   7054   6994   6816   6700   6588   6480   6374   6270   6109   6071   5974   5881     30   7175   7060   6990   6812   6698   6685   6476   6370   6267   6166   6067   5971   5881     31   7117   7046   6926   6808   6694   6688   6674   6358   6292   6164   6066   5996   5871     32   7170   7046   6926   6808   6689   6585   6476   6356   6426   6356   6067   5971   5876     33   7166   7040   6990   6803   6689   6687   6676   6668   6557   6469   6263   6265   6164   6066   5996   5871     34   7166   7040   6990   6789   6686   6577   6469   6363   6269   6164   6065   5996   5871      | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      | <i>\$</i> 909 |
| 18   7210   7085   6964   6845   6739   6618   6508   6409   6298   6194   6005   5698   5905   6805   6844   6738   6614   6505   6398   6394   6193   6005   5698   5905   6805   6814   6736   6614   6505   6398   6394   6193   6004   5997   5905   6807   6792   6610   6501   6305   6395   63   | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| 44   7906   7083   6962   6844   6728   6616   6507   6400   6296   6194   6095   5998   5901   16   7304   7079   6956   6889   6724   6612   6503   6397   6293   6193   6094   5997   5901   17   7302   7077   6956   6887   6722   6610   6501   6395   6293   6193   6090   5995   5901   18   7300   7075   6956   6887   6721   6605   6500   6395   6289   6188   6095   5992   8891   19   7197   7073   6956   6884   6711   6605   6605   6595   6286   6184   6085   5982   8891   21   7193   7069   6946   6886   6715   6603   6494   6388   6284   6183   6084   5987   5892   22   7191   7067   6946   6898   6713   6603   6494   6388   6284   6183   6084   5987   5892   22   7191   7067   6946   6828   6711   6007   6596   6485   6379   6279   6178   6007   5996   6482   6711   6395   6494   6386   6384   6281   6179   6000   5984   6886   6711   6399   6490   6384   6281   6179   6000   5984   6886   6711   6399   6490   6384   6281   6179   6000   5984   6886   6711   6399   6490   6485   6379   6275   6178   6007   5986   6485   6379   6275   6178   6007   5996   6485   6379   6275   6178   6007   5996   6485   6379   6275   6178   6007   5996   6485   6379   6275   6174   6007   5976   5881   6297   7177   7052   6932   6814   6700   6588   6480   6374   6270   6169   6071   5976   5881   6371   63   | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5905          |
| 16   |     |             |             |      |      |      | 6728 |       |         |       |      |      |             |      | <b>59</b> 09  |
| 17   7202   7077   6956   6897   6792   6610   6501   6895   6291   6188   6090   55992   5891   19   7197   7073   6952   6884   6719   6607   6498   6391   6287   6186   6087   5990   5891   19   7197   7073   6952   6884   6719   6607   6498   6391   6287   6186   6087   5990   5891   22   7191   7067   6956   6898   6898   6715   6603   6494   6388   6384   6188   6084   5987   5892   22   7191   7067   6946   6882   6713   6601   6492   6386   6282   6181   6082   5895   5899   2891   22   7191   7067   6946   6882   6713   6601   6492   6386   6282   6181   6082   5895   5899   2891   23   7189   7065   6944   6826   6711   6599   6490   6384   6281   6179   6080   5984   5881   25   7185   7051   6940   6822   6707   6596   6487   6381   6277   6176   6007   5986   6882   6718   6082   6707   6596   6487   6381   6277   6176   6077   5980   6888   225   7185   7059   6988   6820   6704   65592   6484   6387   6275   6174   6075   5976   5881   29   7177   7054   6932   6816   6702   6595   6482   6376   6277   6178   6074   5977   5881   29   7177   7056   6932   6814   6700   6588   6440   6374   6270   6166   6067   5971   5881   3712   7048   6928   6808   6694   6585   6476   6370   6267   6166   6067   5971   5874   5884   37168   7044   6922   6808   6694   6585   6476   6370   6267   6166   6067   5971   5874   5884   357168   7044   6922   6805   6698   6585   6476   6370   6265   6164   6066   5969   5871   34716   7042   6922   6805   6698   6585   6476   6370   6265   6164   6066   5969   5871   34716   7048   6922   6805   6698   6685   6476   6370   6265   6164   6066   5871      | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| 18   7200   7075   6954   6886   6721   6605   6500   6899   6289   6188   6089   5992   5892     19   7197   7073   6952   68834   6719   6607   6498   6391   6287   6186   6087   5990   5892     20   7195   7071   6950   6832   6717   6605   6496   6390   6286   6184   6085   5588   5892     21   7193   7066   6946   6828   6713   6601   6492   6386   6282   6181   6082   5585   5892     22   7191   7067   6946   6826   6713   6505   6496   6384   6281   6179   6080   5684     24   7187   7063   6944   6826   6713   6795   6490   6384   6281   6179   6080   5684     25   7185   7061   6940   6822   6707   6596   6487   6381   6277   6126   6077   5986     26   7183   7057   6936   6818   6704   6592   6485   6379   6275   6126   6075     27   7181   7057   6936   6818   6702   6595   6485   6379   6275   6126   6077   5980     28   7177   7052   6932   6814   6700   6588   6480   6374   6270   6169   6071   5977   5885     29   7177   7052   6932   6814   6700   6588   6480   6374   6270   6169   6071   5977   5885     30   7175   7060   6930   6812   6698   6587   6478   6370   6267   6166   6067   5971   5876     31   7172   7048   6928   6810   6696   6585   6476   6370   6267   6166   6067   5971   5876     33   7168   7044   6924   6807   6698   6587   6473   6367   6264   6166   6067   5971   5876     33   7168   7044   6924   6807   6688   6689   6577   6469   6362   6260   6159   6061   5964   5877     35   7164   7040   6990   6803   6689   6577   6469   6362   6260   6159   6061   5964   5877     35   7164   7040   6990   6803   6689   6577   6469   6362   6260   6158   6059   5971     36   7162   7038   6918   6804   6689   6577   6469   6362   6260   6158   6059   5971     38   7158   7034   6914   6797   6668   6577   6469   6362   6260   6159   6061   5964   5872     40   7153   7030   6910   6779   6668   6577   6464   6358   6255   6158   6059   5954   5860     41   7119   7016   6896   6780   6666   6556   6445   6359   6257   6469   6357   6469   6357   6469   6357   6469   6357   6469   6   | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5898          |
| 20 7195 7071 6950 6832 6717 6605 6496 6390 6286 6184 6085 5988 5899 21 7193 7069 6948 6830 6715 6603 6494 6388 6384 6183 6084 5587 5895 22 7191 7067 6946 6828 6713 6501 6492 6386 6282 6181 6082 5985 5885 23 7189 7065 6944 6826 6711 6599 6499 6384 6282 6181 6082 5985 5885 24 7187 7063 6942 6822 6707 6596 6487 6388 6279 6178 6079 5982 6888 25 7185 7061 6940 6822 6707 6596 6487 6838 6279 6178 6079 5982 6888 26 7183 7059 6938 6820 6705 6594 6485 6379 6275 6126 6075 5980 5888 26 7183 7059 6938 6820 6705 6594 6485 6379 6275 6126 6075 5980 5888 27 7177 7057 6995 6818 6702 6599 6482 6377 6274 6173 6074 5977 8885 28 7179 7054 6934 6816 6702 6599 6488 6377 6274 6173 6074 5977 8885 29 7177 7052 6932 6814 6700 6588 6480 6374 6270 6169 6071 5974 5886 30 7175 7050 6930 6812 6698 6585 6478 6372 6269 6168 6069 5973 5878 31 7172 7046 6926 6808 6694 6583 6474 6369 6265 6164 6066 5969 5873 31 7160 7046 6926 6808 6694 6583 6474 6369 6265 6164 6066 5969 5873 33 7168 7044 6924 6807 6699 6585 6473 6367 6264 6163 6064 5968 5873 34 7166 7042 6992 6805 6690 6579 6471 6365 6064 5966 5873 35 7164 7040 6920 6805 6690 6579 6471 6365 6062 6164 6066 5969 5873 36 7162 7038 6918 6804 6687 6576 6467 6362 6266 6164 6066 5969 5873 37 7160 7036 6916 6799 6685 6577 6469 6365 6226 6164 6066 5969 5873 36 7162 7038 6918 6804 6687 6572 6464 6358 6225 6161 6062 5966 5877 36 7164 7040 6920 6805 6690 6570 6462 6358 6255 6164 6065 5966 5877 36 7162 7038 6918 6804 6687 6570 6462 6358 6255 6164 6065 5966 5877 36 7169 7032 6902 6805 6690 6570 6462 6358 6255 6154 6004 5968 4874 37 7160 7036 6916 6799 6685 6571 6462 6358 6255 6154 6004 5968 4874 37 7170 706 6906 6789 6675 6686 6570 6467 6385 6225 6151 6053 5955 8864 40 7153 7006 6886 6770 6666 6556 6457 6449 6349 6245 6153 6055 5958 8864 41 7151 7026 6906 6789 6678 6666 6556 6448 6358 6225 6151 6063 5959 8864 42 7149 7026 6906 6780 6666 6556 6446 6358 6429 6394 6247 6149 6049 5954 5886 47 7139 7016 6896 6780 6666 6556 6448 6359 6325 6134 6039 5954 5886 47 7113 7006 6886 6772 6566 6550 6449 6339 6236 6139 6033 59 | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5897          |
| 21         7193         7069         6946         6830         6715         6603         6494         6988         6282         6181         6082         5985         5895           22         7191         7067         6946         6828         6711         6599         6490         6384         6281         6179         6080         5985         5895         5895           23         7187         7063         6942         6824         6709         6598         6489         6383         6271         6176         6070         5986         6487         6381         6277         6126         6077         5980         5882           26         7183         7057         6996         6818         6704         6599         6484         6377         6272         6174         6075         5977         888           28         7177         7052         6932         6814         6700         6588         6480         6374         6272         6173         6075         5977         5880           29         7177         7052         6932         6814         6700         6588         6480         6374         6270         6169         6075<   |     | 19          | 7197        | 7073 | 6952 | 6834 | 6719 | 6607  | 6498    | 6391  | 6287 | 6186 | 6087        | 5990 | 5895          |
| 2.2         7191         7067         6944         6828         6713         6601         6499         6886         68284         6119         6080         5985         5884           24         7187         7063         6942         6824         6709         6598         6489         6881         6279         6178         8079         5982         5884           25         7183         7059         6938         6820         6705         6594         6485         6379         6275         6174         6075         5980         5881         6277         6126         6077         5980         5881         6704         6592         6484         6877         6274         6173         6074         5977         5883         29         7177         7052         6932         6810         6702         6590         6482         6376         6274         6173         6074         5977         5883         29         7177         7052         6932         6810         6698         6587         6478         6372         6169         6071         5976         5881         23         7177         7052         6932         6810         6696         6588         6480   | H   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5894          |
| 23 7189 7065 6944 6826 6711 6599 6490 6384 6281 6179 6080 5984 6885 24 7187 7063 6942 6824 6709 6598 6489 6383 6279 6178 6077 5980 6888 25 7185 7059 6938 6890 6705 6594 6485 6379 6275 6174 6077 5980 6888 7179 7054 6994 6816 6702 6599 6484 6877 6274 6173 6074 5977 8885 28 7179 7054 6994 6816 6702 6599 6484 6877 6274 6173 6074 5977 8885 29 7177 7052 6932 6814 6700 6588 6480 6374 6270 6109 6071 5974 5880 30 7175 7050 6930 6812 6698 6587 6478 6376 6272 6171 6072 5976 5881 31 7172 7048 6928 6810 6696 6585 6476 6370 6269 6168 6069 5973 5876 32 7170 7046 6926 6808 6694 6583 6474 6369 6265 6164 6066 5969 5873 31 7168 7044 6924 6807 6692 6581 6473 6367 6264 6163 6064 5968 5877 164 7040 6920 6803 6694 6587 6478 6360 6262 6164 6062 5969 5873 35 7164 7040 6920 6803 6689 6577 6469 6363 6262 6164 6062 5966 5877 35 7160 7038 6918 6916 6797 6683 6572 6469 6363 6260 6159 6061 5964 5877 35 7160 7036 6916 6797 6683 6572 6469 6363 6260 6159 6061 5964 5877 35 7160 7036 6916 6797 6683 6576 6467 6362 6255 6154 6052 5966 5877 38 7169 7038 6918 6807 6695 6579 6471 6365 6262 6165 6052 5966 5877 6469 6363 6200 6159 6061 5964 5877 38 7169 7038 6918 6797 6683 6577 6469 6363 6250 6159 6061 5964 5877 38 7169 7038 6918 6797 6683 6572 6469 6355 6250 6159 6051 5965 5963 8861 39 7156 7032 6912 6795 6681 6570 6462 6357 6254 6153 6055 5960 5864 38 7158 7034 6914 6797 6683 6572 6464 6358 6255 6154 6052 5966 5878 44 7145 7032 6902 6785 6681 6570 6462 6357 6254 6153 6055 5960 5864 43 7147 7024 6904 6787 6662 6556 6457 6858 6255 6154 6058 5951 5865 442 7143 7026 6904 6787 6662 6556 6457 6848 6353 6250 6153 6053 5950 5864 43 7147 7024 6904 6787 6664 6556 6457 6348 6349 6245 6164 6048 5950 5856 445 7143 7000 6806 6780 6676 6556 6457 6848 6353 6250 6149 6053 5955 5865 445 7143 7000 6886 6780 6666 6556 6448 6342 6240 6139 6041 5945 5955 5865 444 7145 7024 6894 6776 6662 6557 6444 6339 6235 6134 6045 5945 5855 5955 5865 577 677 6706 6886 6770 6666 6557 6444 6339 6235 6134 6045 5945 5855 577 677 6664 6559 6448 6339 6235 6138 6040 5945 5855 577 6664 6559 644 | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| 24         7187         7063         6942         6824         6709         6598         6489         6883         6279         5975         5980         5885         5886         227         6176         6975         5980         6882         6707         6596         6485         6371         6176         6077         5990         5886         6275         6174         6075         5979         5884         6277         7181         7057         6993         6816         6704         6599         6484         6377         6274         6173         6074         5977         8881         227         7177         7056         6993         6816         6704         6599         6482         6376         6272         6171         6072         5976         5881         327         7170         7046         6992         6818         6587         6478         6372         6269         6168         6069         5973         5877         337         7168         7044         6992         6808         6694         6583         6474         6369         6265         6608         6694         6583         6474         6369         6265         6606         5585         6476         6369<  | I   |             |             |      |      |      |      |       | l.      |       |      |      |             |      | <i>5</i> 889  |
| 26   | I   |             |             |      |      |      |      |       |         |       | 6279 |      |             | 5982 | 5888          |
| 727   7181   7057   6936   6818   6704   6592   6484   6877   6274   6173   6074   5977   8885   28   7179   7054   6934   6816   6702   6595   6482   6376   6272   6171   6072   5976   5881   29   7177   7052   6932   6814   6700   6588   6480   6374   6270   6169   6071   5974   5881   30   7175   7050   6930   6812   6698   6585   6476   6370   6267   6166   6067   5971   5876   5881   7172   7048   6928   6810   6696   6585   6476   6370   6267   6166   6067   5971   5876   5881   5771   7046   6926   6808   6694   6583   6474   6369   6265   6164   6066   5969   5873   37168   7044   6924   6807   6692   6581   6473   6367   6264   6163   6064   5968   5873   34   7166   7042   6922   6805   6690   6579   6471   6365   6262   6161   6062   5966   5873   35   7164   7040   6920   6803   6687   6577   6463   6263   6260   6159   6061   5964   5876   35   7160   7036   6916   6799   6685   6577   6463   6263   6226   6159   6061   5964   5876   38   7158   7034   6914   6797   6683   6572   6464   6358   6255   6154   6056   5960   5866   38   7158   7034   6914   6797   6683   6572   6462   6357   6255   6154   6056   5960   5866   39   7156   7032   6912   6795   6681   6570   6462   6357   6255   6154   6056   5960   5866   41   7151   7028   6908   6791   6677   6566   6465   6355   6252   6151   6053   5957   5866   42   7149   7026   6906   6787   6674   6565   6455   6349   6247   6146   6048   5950   5864   43   7147   7024   6904   6787   6674   6563   6455   6349   6247   6146   6048   5950   5864   43   7147   7024   6904   6787   6674   6563   6455   6349   6247   6146   6048   5950   5864   44   7113   7026   6906   6780   6676   6559   6451   6346   6243   6143   6045   5945   5864   44   7113   7026   6906   6780   6664   6556   6455   6348   6245   6144   6046   5950   5856   445   7141   7018   6898   6782   6668   6557   6446   6344   6241   6141   6043   5947   5855   6455   6446   6344   6244   6446   6446   6446   6446   6446   6446   6446   6446   6446   6446   6446   6446   6446   644   | I   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5886          |
| 28   | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| 29   7177   7052   6932   6814   6700   6588   6480   6374   6270   6169   6071   5974   5886  | ľ   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| 31         7172         7048         6928         6810         6696         6585         6476         6370         6267         6166         6067         5971         5876           32         7170         7046         6926         6808         6694         6583         6474         6369         6365         6164         6066         5969         5871           34         7166         7042         6922         6805         6690         6577         6461         6365         6262         6161         6062         5966         5873           35         7164         7040         6920         6803         6689         6577         6469         6263         6260         6159         6961         5964         5873           36         7162         7038         6918         6804         6687         6576         6467         6362         6259         6158         6055         5963         5866           37         7160         7036         6916         6799         6683         6574         6462         6357         6254         6158         6055         5960         5866           38         7153         7030         6910  |     |             |             |      |      |      |      |       |         |       |      |      |             | 5974 | 588Q          |
| 32         7170         7046         6926         6808         6694         6583         6474         6369         6265         6164         6066         5969         5872           33         7168         7042         6922         6805         6690         6571         6471         6365         6262         6161         6062         5966         5873           35         7164         7040         6990         6803         6689         6577         6469         6363         6260         6161         6062         5966         5873           36         7162         7038         6918         6804         6687         6576         6467         6362         6259         6158         6059         5963         5863           37         7160         7036         6914         6797         6683         6572         6464         6358         6257         6156         6058         5961         5863           38         7158         7032         6912         6793         6679         6568         6460         6355         6252         6151         6055         5960         5866           40         7153         7026         6906  | II. | 30          | 7175        | 7050 | 6930 | 6812 | 6698 | 6587  | 6478    | 6372  |      | 6168 |             |      | 5878          |
| 33         7168         7044         6924         6807         6692         6581         6473         G367         6264         6163         6064         5968         5874           34         7166         7042         6922         6805         6690         6579         6471         6365         6262         6161         6062         5966         5875           36         7164         7040         6920         6803         6689         6577         6469         6363         6260         6159         6061         5964         5870           36         7160         7036         6918         6804         6687         6576         6467         6362         6259         6158         6059         5963         5861           38         7158         7034         6914         6797         6683         6572         6464         6358         6255         6154         6056         5960         5861           39         7156         7032         6912         6795         6668         6460         6355         6252         6151         6056         5960         5866           40         7153         7020         6906         6789  | I   |             | 1 1         |      |      |      |      |       |         |       |      |      |             |      | 5876          |
| 34         7166         7042         6922         6805         6690         6579         6471         6365         6262         6161         6062         5966         5872           35         7164         7040         6920         6803         6689         6577         6469         6363         6260         6159         6061         5964         5877           36         7160         7038         6918         6804         6687         6576         6467         6362         6257         6158         6059         5963         5863           37         7150         7034         6914         6797         6683         6572         6464         6358         6255         6154         6056         5960         5866           39         7156         7032         6912         6795         66681         6570         6462         6357         6254         6153         6055         5960         5866           40         7153         7030         6910         6793         6679         6568         6460         6355         6252         6151         6053         5957         5863           41         7153         7026         6906 <th>H</th> <th></th>  | H   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| S5   | I   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5872          |
| 37         7160         7086         6916         6799         6685         £574         £465         6360         6257         6156         6058         5961         5867           38         7158         7034         6912         6795         6681         6570         6462         6357         6254         6153         6055         5960         5866           39         7156         7032         6912         6795         6681         6570         6462         6357         6254         6153         6055         5958         5866           40         7153         7030         6910         6793         6677         6566         6458         6353         6250         6149         6051         5955         5861           42         7149         7026         6906         6787         6674         6563         6455         6349         6247         6146         6048         5952         5355           44         7145         7022         6902         6785         6672         6561         6453         6348         6247         6146         6048         5952         5355           45         7143         7020         6902  | H   |             |             |      |      |      |      |       |         |       |      |      |             |      | 587C          |
| 38         7158         7034         6914         6797         6683         6572         6464         6358         6255         6154         6056         5960         5866           39         7156         7032         6912         6795         6681         6570         6462         6357         6254         6153         6055         5958         5864           40         7153         7030         6910         6793         6679         6568         6460         6355         6250         6149         6051         5957         5863           41         7151         7026         6906         6789         6679         6566         6458         6353         6250         6149         6051         5955         5861           42         7149         7026         6904         6787         6674         6563         6455         6345         6245         6149         6050         5955         5861           43         7147         7024         6904         6787         6674         6563         6455         6345         6245         6149         6048         5952         5956           45         7143         7020         6900  | 1   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| 39   | I   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5866          |
| 41 7151 7028 6908 6791 6677 6566 6458 6353 6250 6149 6051 5955 5861 42 7149 7026 6906 6789 6676 6585 6457 6345 8248 6148 6050 5954 5866 43 7147 7024 6904 6787 6674 6563 6455 6349 6247 6146 6048 5952 5358 44 7145 7022 6902 6785 6672 6561 6453 6348 6245 6144 6046 5950 5856 45 7143 7020 6900 6784 6670 6559 6451 6346 6243 6143 6045 5950 5856 46 7141 7018 6898 6782 6668 6557 6449 6344 6241 6141 6043 5947 5855 47 7139 7016 6896 6780 6666 6556 6448 6342 6240 6139 6041 5945 5853 48 7137 7014 6894 6778 6664 6554 6446 6341 6238 6138 6040 5944 5856 49 7135 7012 6892 6776 6662 6552 6444 6339 6236 6136 6038 5942 5845 50 7133 7010 6890 6774 6660 6550 6442 6337 6235 6138 6040 5944 5855 51 7131 7008 6888 6772 6659 6548 6441 6339 6236 6136 6038 5942 5845 52 7128 7006 6886 6770 6657 6546 6493 6334 6231 6131 6033 5938 5844 53 7126 7004 6884 6768 6655 6545 6447 6339 6236 6136 6038 5942 5845 54 7,124 7002 6882 6766 6655 6545 6447 6392 6230 6130 6032 5936 5844 54 7,124 7002 6882 6766 6655 6545 6437 6332 6230 6130 6032 5936 5844 54 7,124 7002 6882 6766 6653 6543 6435 6331 6228 6128 6030 5935 5841 55 7122 7000 6880 6764 6651 6541 6434 6329 6226 6126 6028 5935 5841 55 7124 7002 6882 6766 6653 6543 6435 6331 6228 6128 6028 5935 5841 55 7124 7002 6882 6766 6653 6543 6435 6331 6228 6128 6030 5935 5841 55 7124 7002 6887 6762 6649 6559 6432 6327 6225 6125 6027 5931 5835 56 7120 6998 6878 6762 6649 6536 6432 6327 6225 6125 6027 5931 5835 57 7118 6996 6877 6761 6648 6536 6432 6323 6223 6123 6025 5930 5835 58 7116 6994 6875 6759 6646 6536 6428 6322 6220 6126 6028 5935 5835 58 7116 6994 6875 6759 6646 6536 6428 6322 6220 6120 6022 5927 5835   | ı   |             |             |      |      |      |      |       |         |       |      |      |             | •    | 5864          |
| 42         7149         7026         6906         6789         6676         6585         6457         6851         8248         6148         6050         5954         5860           43         7147         7024         6904         6787         6674         6563         6455         6349         6247         6146         6048         5952         5956           44         7145         7020         6900         6785         6672         6561         6453         6346         6243         6144         6045         5950         5856           45         7141         7018         6898         6782         6668         6557         6449         6344         6243         6141         6043         5947         5856           47         7139         7016         6896         6780         6666         6556         6448         6342         6240         6139         6041         5945         5856           48         7137         7012         6892         6776         6662         6552         6444         6341         6238         6138         6040         5942         5846           50         7133         7010         6890  | l   | 40          | 7153        | 7030 | 6910 | 6793 | 6679 | 6568  | 6460    | 6355  | 6252 | 6151 | <b>6053</b> |      | 5862          |
| 43         7147         7024         6904         6787         6674         6563         6455         6349         6247         6146         6048         5952         5356         44         7145         7020         6902         6785         6672         6561         6453         6348         6245         6144         6046         5950         5856         45         7143         7020         6900         6784         6670         6559         6451         6346         6243         6143         6045         5949         5852         46         7141         7018         6898         6782         6668         6557         6449         6344         6241         6143         6043         5947         5852         47         7139         7016         6896         6780         6666         6556         6448         6342         6240         6139         6041         5945         5852         48         7137         7014         6894         6778         6664         6554         6446         6341         6238         6138         6040         5944         5856         49         7135         7010         6890         6774         6660         6550         6442         6337   | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| 44         7145         7022         6902         6785         6672         6561         6453         6348         6245         6144         6046         5950         5856           45         7143         7020         6900         6784         6670         6559         6451         6346         6243         6143         6045         5949         5855           46         7141         7018         6898         6782         6668         6557         6449         6344         6241         6141         6043         5947         5853           47         7139         7016         6896         6780         6666         6556         6448         6342         6240         6139         6041         5945         5853           48         7135         7012         6892         6776         6662         6552         6444         6341         6238         6138         6040         5944         5853           49         7135         7010         6890         6774         6660         6550         6442         6337         6235         6134         6037         5941         5847           51         7131         7006         6886  | ł   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| 45 7143 7020 6900 6784 6670 6559 6451 6346 6243 6143 6045 5949 5855 47 7139 7016 6896 6782 6668 6557 6449 6344 6241 6141 6043 5947 5855 48 7137 7014 6894 6778 6664 6554 6446 6341 6238 6138 6040 5944 5850 49 7135 7012 6892 6776 6662 6552 6444 6339 6236 6136 6038 5942 5845 557 7131 7008 6886 6772 6659 6558 6441 6339 6236 6136 6038 5942 5845 552 7128 7006 6886 6770 6657 6546 6441 6339 6334 6231 6133 6035 5939 5844 53 7126 7004 6884 6768 6655 6545 6447 6399 6230 6130 6032 5936 5844 54 7,124 7002 6882 6766 6653 6545 6437 6382 6230 6130 6032 5936 5844 54 7,124 7002 6882 6766 6653 6545 6437 6382 6230 6130 6032 5936 5844 55 7122 7000 6880 6764 6651 6541 6434 6399 6226 6126 6028 5935 5841 55 7122 7000 6880 6764 6651 6541 6434 6329 6220 6120 6028 5935 5841 55 7120 6998 6878 6762 6649 6539 6432 6327 6225 6125 6027 5931 5835 57 7118 6996 6877 6761 6648 6538 6439 6327 6225 6125 6027 5931 5835 58716 6994 6875 6759 6646 6536 6428 6323 6221 6121 6024 5928 5835 59 7114 6992 6873 6757 6644 6534 6426 6322 6220 6120 6022 5927 5835 5834 534 3357 3357 3367 3377 387 887 887 407 417 427 437 447 457 4457 4457 4457 4457 4457 4   | J   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5856          |
| 47         7139         7016         6896         6780         6666         6556         6448         6342         6240         6139         6041         5945         5856           48         7137         7014         6894         6778         6664         6554         6446         6341         6238         6138         6040         5944         5850           49         7135         7012         6892         6776         6662         6552         6444         6339         6236         6136         6038         5942         5846           50         7133         7010         6890         6774         6660         6550         6442         6337         6235         6134         6037         5941         5847           51         7131         7008         6888         6772         6659         6548         6441         6336         6233         6133         6035         5939         5846           52         7128         7006         6886         6770         6657         6546         6439         6334         6231         6131         6035         5939         5846           54         7,124         7002         6882 <th>I</th> <th></th> <th>7143</th> <th></th> <th></th> <th>6784</th> <th>6670</th> <th>-6559</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>5855</th>   | I   |             | 7143        |      |      | 6784 | 6670 | -6559 |         |       |      |      |             |      | 5855          |
| 48         7137         7014         6894         6778         6664         6554         6446         6341         6238         6138         6040         5944         5856           49         7135         7012         6892         6776         6662         6552         6444         6339         6236         6136         6040         5944         5856           50         7133         7010         6890         6774         6660         6550         6442         6337         6235         6134         6037         5941         5847           51         7131         7006         6886         6770         6659         6548         6441         6336         6233         6133         6035         5939         5844           52         7128         7006         6886         6770         6546         6439         6334         6291         6131         6033         5938         5844           53         7124         3002         6882         6766         6653         6545         6437         6332         6230         6130         6032         5935         5841           54         7,124         3002         6882         6766 <th>i</th> <th></th>  | i   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| 49         7135         7012         6892         6776         6662         6552         6444         6339         6236         6136         6038         5942         5842           50         7133         7010         6890         6774         6660         6550         6442         6337         6235         6134         6037         5941         5847           51         7131         7008         6888         6772         6659         6548         6441         6336         6233         6133         6035         5939         5846           52         7128         7006         6886         6770         6657         6546         6439         6334         6231         6131         6035         5939         5846           53         7126         7004         6884         6768         6655         6545         6437         6332         6230         6190         6032         5936         5845           54         7,124         7002         6882         6766         6653         6543         6435         6331         6228         6128         6000         5935         5841           55         7122         7000         6880 <th>ı</th> <th></th> <th>5850</th>  | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5850          |
| 51         7131         7008         6888         6772         6659         6548         6441         6336         6233         6133         6035         5939         5846           52         7128         7006         6886         6770         6657         6546         6439         6334         6291         6191         6035         5938         5844           53         7126         7004         6884         6768         6655         6545         6437         6392         6290         6190         6032         5936         5845           54         7,124         7002         6882         6766         6653         6543         6435         6331         6228         6128         6000         5935         5841           55         7122         7000         6880         6764         6651         6541         6434         6329         6226         6126         6028         5933         583           56         7120         6998         6878         6762         6649         6539         6432         6327         6225         6125         6027         5931         583           57         7118         6996         6877   | l   |             |             |      |      |      |      |       |         |       |      |      | 6038        | 5942 | 5849          |
| 52         7128         7006         6886         6770         6657         6546         6439         6334         6291         6131         6033         5998         5844           53         7126         7004         6884         6768         6655         6545         6437         6392         6230         6190         6032         5996         5845           54         7,124         7000         6882         6766         6653         6543         6435         6331         6228         6128         6090         5935         5841           55         7122         7000         6880         6764         6651         6541         6434         6329         6226         6126         6028         5935         5841           56         7120         6998         6878         6762         6649         6539         6432         6327         6225         6125         6027         5931         585           57         7118         6996         6877         6761         6648         6538         6430         6325         6223         6123         6025         5930         5836           58         7116         6994         6875  | ľ   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5847          |
| 53         7126         7004         6884         6768         6655         6545         6437         6832         6230         6130         6032         5936         5842           54         7,124         7002         6882         6766         6653         6543         6435         6381         6228         6128         6090         5935         5841           55         7122         7000         6880         6764         6651         6541         6434         6329         6226         6126         6028         5933         585           56         7120         6998         6878         6762         6649         6539         6432         6927         6225         6125         6027         5931         583           57         7118         6996         6877         6761         6648         6538         6430         6325         6223         6125         6027         5931         583           58         7116         6994         6875         6759         6646         6536         6428         6323         6221         6121         6024         5928         583           59         7114         6992         6873   | ı   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| 54         7,124         7002         6882         6766         6653         6543         6435         6331         6228         6128         6090         5935         5841           55         7122         7000         6880         6764         6651         6541         6434         6329         6226         6126         6028         5933         5881           56         7120         6998         6878         6762         6649         6539         6432         6927         6225         6125         6027         5931         5836           57         7118         6996         6877         6761         6648         6538         6430         6325         6223         6125         6027         5930         5836           58         7116         6994         6875         6759         6646         6536         6428         6323         6221         6121         6024         5928         5835           59         7114         6992         6873         6757         6644         6534         6426         6322         6220         6120         6022         5927         5835           34'         35'         36'         37'   | i   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5842          |
| 56         7120         6998         6878         6762         6649         6539         6432         6327         6225         6125         6027         5931         5886           57         7118         6996         6877         6761         6648         6538         6430         6325         6223         6123         6025         5990         5836           58         7116         6994         6875         6759         6646         6536         6428         6323         6221         6121         6024         5928         5835           59         7114         6992         6873         6757         6644         6534         6426         6322         6220         6120         6022         5927         5832           34'         35'         36'         37'         38'         59'         40'         41'         42'         49'         44'         45'         46'  | I   | <b>54</b> · |             |      |      |      |      |       |         | 6381  | 6228 | 6128 | 6030        | 5935 | 5841          |
| 57     7118     6996     6877     6761     6648     6538     6430     6325     6223     6123     6025     5990     5836       58     7116     6994     6875     6759     6646     6536     6428     6323     6221     6121     6024     5928     5835       59     7114     6992     6873     6757     6644     6534     6426     6322     6220     6120     6022     5927     5832       34'     35'     36'     37'     38'     59'     40'     41'     42'     49'     44'     45'     46'  | I   |             |             |      |      |      |      |       |         |       |      |      |             |      | 5839          |
| 58 7116 6994 6875 6759 6646 6536 6428 6323 6221 6121 6024 5928 5835 59 7114 6992 6873 6757 6644 6534 6426 6322 6220 6120 6022 5927 5835 34' 35' 36' 37' 38' 85' 85' 40' 41' 42' 43' 44' 45' 46'  | I   |             |             |      |      |      |      |       |         |       |      |      |             |      |               |
| 59         7114         6992         6873         6757         6644         6534         6426         6322         6220         6120         6022         5927         5833           34'         35'         36'         37'         38'         59'         40'         41'         42'         43'         44'         45'         46'  | I   |             |             |      |      |      |      |       |         |       |      |      |             |      | <b>5835</b>   |
| 34' 35' 36' 37' 38' 55' 40' 41' 42' 48' 44' 45' 46'  | ı   |             |             |      | 6873 |      |      |       |         | 6322  | 1    |      | 6022        | 5927 | 5833          |
|  | ľ   | -           | 34          | 35'  | 36'  | 37'  | 38/  | 897   | 40/     | 41'   | 42'  | 49'  | 44/         | 45'  | 46'           |

TABLE XLI.

|            |                 |              |               |              |              | <del></del>  |              |                      |              |              |              |              |              |
|------------|-----------------|--------------|---------------|--------------|--------------|--------------|--------------|----------------------|--------------|--------------|--------------|--------------|--------------|
| _ '        | l <del></del> - |              |               | 1            |              |              | DROL         |                      |              |              |              | 107 1        |              |
| Sec.       | 47'             | 48'          | 49'           | 50           | 51'          | 52'          | 53/          | 54'                  | 55           | 56'          | 57'          | 587          | 59           |
| 0          | 5832            | 5740         | 5651          | 5563         | 5477         | 6393         | 5310         | 5229                 | 5149         | 5071         | 4994         | 4918         | 1844         |
| 1          | 5830            | <i>5</i> 739 | 5649          | 5561         | 5475         | 5391         | 5308         | 5227                 | 5148         | 5069         | 4992         | 4917         | 4843         |
| 2          | 5828            | 5737         | 5648          | 5560         | 5474         | 5390         | 5307         | 5226                 | 5146         | 5068         | 4991         | 4916         | 4842<br>4841 |
| . 3<br>4   | 5827<br>5825    | 5736<br>5734 | 5645          | 5559<br>5557 | 5473<br>5471 | 5389<br>5387 | 5306         | 5225<br>52 <b>23</b> | 5145<br>5144 | 5067<br>5065 | 4990<br>4989 | 4915<br>4913 | 4839         |
| 5          | 5824            | 5733         | 5643          | 5556         | 5470         | 5386         | 5304<br>5303 | 5222                 | 5142         | 5064         | 4987         | 4912         | 4838         |
| 6          | 5823            | 5731         | 5642          | 5554         | 5469         | 5984         | 5302         | 5221                 | 5141         | 5063         | 4986         | 4911         | 4837         |
| .7.        | 5821            | 5730         | 5640          | 5553         | 5467         | 5583         | 5300         | 5219                 | 5140         | 5062         | 4985         | 4910         | 4895         |
| 8          | 5819            | 5728         | 5639          | 5551         | 5465         | 5381         | 5299         | 5218                 | 5138         | <i>5</i> 060 | 4984         | 4908         | 4834         |
| 9          | 5818            | 5727         | 5637          | <i>555</i> 0 | 5464         | 5380         | 5298         | 5217                 | 5137         | 5059         | 4985         | 4907         | 4833         |
| 10         | 5816            | 5725         | 5636          | 5548         | 5463         | 5379         | 5296         | 5215                 | 5136         | <i>5</i> 058 | 4981         | 4906         | 489          |
| 11         | 5815            | 5724         | 5634          | 5547         | 5461         | 5377         | 5295         | 5214                 | 5134         | 5056         | 4980         | 4905         | 483          |
| 12         | 5813            | 5722         | 5633          | 5546         | 5460         | 5376         | 5294         | 5213                 | 5133         | 505          | 4979         | 4903         | 4830         |
| 13         | 5812<br>5810    | 5721         | 5631          | 5544         | 5458         | 5874         | 5292         | 5211                 | 5132         | 5054         | 4977<br>4976 | 4902<br>4901 | 482          |
| 14<br>15   | 5809            | 5719<br>5718 | 5630<br>5629  | 5543<br>5541 | 5457<br>5456 | 5373<br>5372 | 5291<br>5290 | 5210<br>5209         | 5130<br>5129 | 5053<br>5051 | 4975         | 4900         | 4826         |
| 16         | 5807            | 5716         | 5627          | 5540         | 5454         | 5370         | 5288         | 5207                 | 5128         | 5050         | 4973         | 4898         | 4824         |
| 17         | 5805            | 5715         | 5626          | 5538         | 5453         | 5369         | 5287         | 5206                 | 5127         | 5049         | 4972         | 4897         | 4823         |
| 18         | 5804            | 5713         | 5624          | 5537         | 5452         | 5368         | 5285         | 5205                 | 5125         | <i>5</i> 048 | 4971         | 4896         | 4829         |
| 19         | 5802            | 5712         | 56 <b>2</b> 3 | 5535         | 5450         | 5366         | 5284         | 5203                 | 5124         | 50A6         | 4970         | 4895         | 4821         |
| 20         | 5801            | 5710         | 5621          | 5594         | 5449         | 5365         | 5283         | 5202                 | 5123         | 5045         | 4968         | 4893         | 4820         |
| 21         | 5800            | 5709         | 5620          | 5533         | 5447         | 5364         | 5281         | 5201                 | 5122         | 5044         | 4967         | 4892         | 4819         |
| 22         | 5798            | 5707         | 5618          | <i>55</i> 31 | 5446         | 5362         | 5280         | 5199                 | 5120         | 5042         | 4966         | 4891         | 4817         |
| 23         | 5796            | 5706         | 5617          | <i>5</i> 530 | 5444         | 5361         | 5278         | 5198                 | 5119         | 5041         | 4965         | 4890         | 4816         |
| 24 25      | 5793            | 5704         | 5615          | 5528         | 5443         | 5359         | 5277         | 5197                 | 5118         | 5040         | 4964         | 4889         | 4815<br>4813 |
| 25<br>26   | 5793<br>5792    | 5703<br>5701 | 5614<br>5612  | 5527<br>5525 | 5441<br>5440 | 5358<br>5356 | 5276         | 5195                 | 5116<br>5115 | 5038<br>5037 | 4962<br>4961 | 4887<br>4886 | 4819         |
| 27         | 5790            | 5700         | 5611          | 5524         | 5439         | 5355         | 5274<br>5273 | 5194<br>5193         | 5114         | 5036         | 4960         | 4885         | 4811         |
| 28         | 5789            | 5698         | 5609          | 5522         | 5437         | 5854         | 5272         | 5191                 | 5112         | <i>5</i> 035 | 4958         | 4883         | 4810         |
| 29         | 5787            | 5697         | 5608          | 5521         | 5436         | 5352         | 5270         | 5190                 | 5111         | <i>5</i> 033 | 4957         | 4882         | 4809         |
| 30         | 5786            | 5695         | 5607          | 5520         | 5435         | 5351         | 5269         | 5189                 | 5110         | 5032         | 4956         | 4881         | 4808         |
| 31         | 5784            | 5694         | 5605          | 5518         | 5433         | 5350         | 5268         | 5187                 | 5108         | 5031         | 4955         | 4880         | 4806         |
| 32         | 5783            | 5693         | 5604          | 5517         | 5432         | 5348         | 5266         | 5186                 | 5107         | 5029         | 4953         | 4878         | 4805         |
| 33         | 5781            | 5691         | 5602          | 5516         | <b>54</b> 30 | 5347         | 5265         | 5185                 | 5106         | 5028         | 4952         | 4877         | 4804         |
| 34         | 5779            | 5689         | 5601          | 5514         | 5429         | 5345         | 5264         | 5183                 | 5104         | 5027         | 4951         | 4876         | 480          |
| 35<br>36   | 5778<br>5777    | 5688<br>5686 | 5599<br>5598  | 5512<br>5511 | 5427<br>5426 | 5344<br>5343 | 5262<br>5261 | 5182<br>5181         | 5103<br>5102 | 5026<br>5025 | 4950<br>4949 | 4875<br>4874 | 4800         |
| 37         | 5775            | 5685         | 5596          | 5510         | 5425         | 5341         | 5260         | 5179                 | 5100         | 5023         | 4947         | 4872         | 4799         |
| 38         | 5773            | 5683         | 5595          | 5508         | 5428         | 5340         | 5258         | 5178                 | 5099         | 5022         | 4946         | 4871         | 4798         |
| 39         | 5772            | `5682        | 5594          | 5507         | 5422         | 5339         | 5257         | 5177                 | 5098         | 5021         | 4945         | 4870         | 4797         |
| 40         | 5770            | 568Q         | 5592          | 5505         | 5420         | 5337         | 5255         | 5175                 | 5097         | 5019         | 4943         | 4869         | 479          |
| - 41       | 5769            | 5679         | 5590          | 5504         | 5419         | 5336         | 5254         | 5174                 | 5095         | 5018         | 4942         | 4867         | 4794         |
| 42         | 5768            | 5677         | 5589          | 5503         | 5418         | 5335         | 5253         | 5173                 | 5094         | 5017         | 4941         | 4866         | 479          |
| 43         | 5766            | 5676         | 5587          | 5501         | 5416         | 5333         | 5251         | 5171                 | 5093         | 5015         | 4940         | 4865         | 479          |
| 44         | 5764            | 5674         | 5586          | 5500         | 5415         | 5332         | <i>525</i> 0 | 5170                 | 5091         | 5014         | 4938         | 4864         | 479          |
| 45<br>46   | 5763            | 5673         | 5585          | 5498         | 5414         | 5331         | 5249         | 5169                 | 5090         | 5013         | 4937         | 4863         | 478          |
| 47         | 5761<br>5760    | 5671<br>5670 | 5583<br>5582  | 5497<br>5495 | 5412<br>5411 | 5329<br>5328 | 5247<br>5246 | 5167<br>5166         | 5089<br>5087 | 5012<br>5010 | 4936<br>4934 | 4861<br>4860 | 478          |
| 48         | 5758            | 5669         | 5580          | 5494         | 5409         | 5326<br>5326 | 5245         | 5165                 | 5086         | 5009         | 4933         | 4859         | 478          |
| 49         | 5757            | 5667         | 5579          | 5492         | 5408         | 5325         | 5243         | 5163                 | 5085         | 5008         | 4932         | 4858         | 478          |
| <i>5</i> 0 | 5755            | 5665         | 5577          | 5491         | 5406         | 5323         | 5242         | <u> </u>             | 5084         | 5006         | 4931         | 4856         | 478          |
| 51         | 5754            | 5664         | 5576          | 5490         | 5405         | 5822         | 5242<br>5241 | 5162<br>5161         | 5082         | 5005         | 4930         | 4855         | 478          |
| 52         | 5752            | 5662         | 5574          |              | 5404         | 5321         | 5239         | 5159                 | 5081         | 5003         | 4928         | 4854         | 478          |
| 53         | 5751            | <b>5</b> 661 | 5573          | 5487         | 5402         | 5319         | 5238         | 5158                 | 5080         | 5003         | 4927         | 4853         | 4779         |
| 54         | 5749            | 5660         | 5572          | 5486         | 5401         | <i>5</i> 318 | 5237         | 5157                 | 5079         | 5002         | 4926         | 4852         | 477          |
| 55<br>56   | 5748            | 5658         | 5570          | 5484         | 5399         | 5317         | 5235         | 5155                 | 5077         | 5000         | 4924         | 4850         | 477          |
| 56 -<br>57 | 5746<br>5745    | 5656<br>5655 | 5569          | 5482         | 5398         | 5815         | 5234         | 5154                 | 5076         | 4999         | 4923<br>4922 | 4849         | 477          |
| 58         | 5743            | 5654         | 5567<br>5566  | 5481<br>5480 | 5397<br>5395 | 5314<br>5312 | 5233<br>5231 | 5153<br>5152         | 5075<br>5073 | 4998<br>4996 | 4922         | 4848<br>4846 | 477          |
| 59         | 5742            | 5652         | 5564          | 5478         | 5394         | 5311         | 5230         | 5150                 | 5072         | 4995         | 4919         | 4845         | 4779         |
|            |                 |              | 1             |              |              |              |              |                      |              |              |              |              |              |

## TABLE XLL.

| 1        | ·            |              |              |              |              | 1 DEC                | REE.         | OP 1         | Hone |              |              |               |              | ,        | <del></del>  |
|----------|--------------|--------------|--------------|--------------|--------------|----------------------|--------------|--------------|------|--------------|--------------|---------------|--------------|----------|--------------|
| Sec.     | 0/ 1         | 1'           | 2'           | 9/ -1        | 4            | 5/                   | 6'           | 7'           |      |              | 10/1         | 11'           | 10/ 1        | 10/ 1    | 14           |
|          |              |              | 3.           | 3′ •         | 4            | 3'                   | 0            | ,            | 8'   | 9            | 10'          | 11.           | 124          | 13′      | 17           |
| 0        | 4771         | 4699         | 4629         | 4559         | 4491         | 4124                 | 4357         | 4292         | 4228 | 4164         | 4102         | 4040          | 3979         | 3919     | 3860         |
| 1        | 4770         | 4698         | 4627         | 4558         | 4490         | 4422                 | 4356         | 4291         | 4226 | 4163         | 4101         | 4039          | 3978         | 3918     | 3859         |
| 2        | 4769         | 4697         | 4626         | 4557         | 4489         | 4421                 | 4355         | 4290         | 4225 | 4162         | 4100         | 4038          | 5977         | 3917     | 3858         |
| 3        | 4768         | 4696         | 4625         | 4356         | 4.188        | 4420                 | 4354         | 4289         | 4224 | 4161         | 4099         | 4037          | 3976         | 3917     | 3857         |
| 4        | 4766         | 4694         | 4624         | 4555         | 4436         | 4419                 | 4353         | 4287         | 4223 | 4160         | 4098         | 4036          | 3975         | 3916     | 3856         |
| 5        | 4765         | 4693         | 4323         | 4553         | 4485         | 4418                 | 4352         | 4286         | 4222 | 4159         | 4097         | 4035          | 3974         | 3915     | 3855         |
| 6        | 4764         | <b>4</b> 69. | 4622         | 4552         | 4484         | 4417                 | 4351         | 4285         | 4221 | 4158         |              | 4034          | 3973         | 3914     | 3 <b>855</b> |
| 7        | 4763         | 4691         | 4620         | 4551         | 4483         | 4416                 | 4349         | 4284         | 4220 | 4157         |              | 4033          |              | 3913     | 3854         |
| 8        | 4761         | 4690         | 4619         | 4550         | 4482         | 4415                 | 4348         | 4283         |      | 4156         |              | 4032          | 3971         | 3912     | 3853         |
| 9        | 4760         | 4689         | 4618         | 4549         | 4481         | 4414                 | 4347         | 4282         | 4218 | 4155         | 4092         | 4031          | 3970         | 3911     | 3852         |
| 10       | 4759         | 4687         | 4617         | 1510         | 4479         | 4410                 | 1916         | 4001         | 4217 | 4154         | 4001         | 4030          | 3969         | 3910     | 3851         |
| ii       | 4758         | 4686         | 4616         | 4548<br>4547 | 4478         | 4412<br>4411         | 4346<br>4345 | 4281<br>4280 |      |              |              | 4029          |              | 3909     | 38 <b>50</b> |
| 12       | 4757         | 4685         | 4615         | 4546         | 4477         |                      |              |              | 4215 |              |              | 4028          |              | 3908     | 3849         |
| 13       | 4755         | 4684         | 4613         | 4544         |              | 4409                 | 4343         |              | 4214 |              |              | 4027          |              | 3907     | 3848         |
| 14       | 4754         | 4683         |              | 4543         |              | 4408                 |              |              | 4213 |              |              | 4026          |              | 3906     | 3847         |
| 15       | 4753         | 4682         | 4612<br>4611 | 4542         |              |                      | 4941         |              | 4212 |              |              | 4025          |              | 3905     | 3846         |
| 16       | 4752         | 4680         | 4610         |              | 4473         |                      | 4940         |              | 4211 |              |              | 4024          |              | 3904     | 3845         |
| 17       | 4751         | 4679         | 4609         | 4540         |              |                      |              |              | 4910 | 4146         | 4084         |               |              | 3903     | 3844         |
| 18       | 4750         | 4678         | 4608         | 4539         | 4471         | 4404                 | 4338         |              |      | 4145         |              | 4022          | 3961         | 3902     | 3843         |
| 19       | 4748         | 4677         | 4606         | 4537         | 4469         | 4402                 | 4336         |              |      | 4144         |              | 4021          | 3960         | 3901     | 3842         |
|          | 3130         | 1011         | 1000         | 2001         | 4109         | 1102                 | 7330         | 7211         |      |              | ·            |               |              | .,,,,,,, | 3072         |
| 20       | 4747         | 4676         | 4605         | 4536         | 4468         | 4401                 | 4335         | 4270         |      |              | 4081         |               |              | 3900     | 3841         |
| 21       | 4746         | 4675         | 4604         | 4535         | 4467         | 4400                 | 4334         |              |      |              | 4080         |               |              | 3899     | 3840         |
| 22       | 4745         | 4673         | 4603         | 4534         | 4466         | 4399                 | 4333         | 4268         | 4204 | 4141         | 4079         | 4018          | 3957         | 3898     | 3839         |
| 23       | 4743         | 4672         | 4602         | 4533         | 4465         | 4398                 | 4332         | 4267         | 4203 | 4140         | 4078         | 4017          | 3956         | 3897     | 3838         |
| 24       | 4742         | 4671         | 4601         | 4532         | 4464         | 4397                 | 4331         | 4266         | 4202 | 4139         | 4077         | 4016          | 3955         | 3896     | 3837         |
| 25       | 4741         | 4670         | 4600         | 4530         | 4463         | 4396                 | 4330         | 4265         | 4201 | 4138         | 4076         | 4015          | 3954         | 3895     | 3836         |
| 26       | 4740         | 4669         | 4598         | 4529         | 4461         | 4895                 | 4329         |              |      | 4137         | 4075         | 4014          | 3953         | 3894     | 3835         |
| 27       | 4739         | 4668         | 4597         | 4528         | 4460         | 4394                 | 4328         | 4263         | 4199 | 4136         | 4074         | 4013          | 3952         | 3893     | 3834         |
| 28       | 4737         | 4666         | 4596         | 4527         | 4459         | 4392                 | 4327         | 4262         | 4198 | 4135         | 4073         | 4012          | .3951        | 3892     | 3833         |
| 29       | 4736         | 4665         | 4595         | 4526         | 4458         | 4391                 | 4326         | 4261         | 4197 | 4134         | 4072         | 4011          | 3950         | 3891     | 3832         |
| 30       | 4705         | 4664         | 4504         | 450-         |              | 4000                 | 4005         | 4000         | 4100 | 4100         | 4071         | 4010          |              | 2000     | 2001         |
| 31       | 4735<br>4734 | 4664         | 4594         | 4525         | 4457         | 4390                 | 4325         | 4260         |      | 4133<br>4132 |              | 4010          | 3949<br>3948 |          | 3831         |
| 82       | 4733         | 4663         | 4593         | 4524         | 4456         | 4389                 | 4323         | 4258         | 4193 |              |              |               |              | 3889     | 3830         |
| 33       | 4732         | 4661         | 4591         | 4523         | 44,55        | 4388                 |              |              |      |              |              |               | 3947         | 3888     | 3829         |
| 33<br>34 | 4730         | 4660<br>4659 | 4590<br>4589 |              | 4454         | 4387                 | 4321         |              |      | 4129         | 4068         | 4007          |              |          | 3828         |
| 35       | 4729         | 4658         | 4588         | 4520         | 4452         | 4386                 | 4820         |              | 4190 |              |              | 4005          |              | 3886     |              |
| 36       | 4728         | 4657         | 4587         | 4519<br>4518 | 4451         | 438 <i>5</i><br>4384 | 4319<br>4318 |              | 4189 |              |              | 4004          |              |          |              |
| 37       | 4727         | 4656         | 4586         | 4517         | 4450<br>4449 | 4382                 | 4317         |              |      | 4126         |              | 4003          |              |          |              |
| 38       | 4725         | 4654         | 4585         | 4516         | 4448         | 4381                 | 4316         | 4251         |      | 4125         |              |               |              | 3882     | 3823         |
| 39       | 4724         | 4653         | 4584         | 4515         | 4447         | 4380                 | 4315         | 4250         |      | 4124         |              |               | 3940         |          | 3822         |
|          |              |              | 1001         | 2010         | 777/         | 1300                 |              |              |      |              |              |               | 3310         | 3001     | 3622         |
| 40       | 4723         | 4652         | 4582         | 4513         | 4446         | 4379                 | 4313         | 4249         | 4185 | 4122         | 4061         | 4000          | 3939         | 3880     | 3821         |
| 41       | 4722         | 4651         | 4581         | 4512         | 4445         | 4378                 | 4312         | 4248         |      | 4121         |              | 3 <b>9</b> 99 |              | 3879     | 3890         |
| 42       | 4721         | 4650         | 4580         | 4511         | 4444         | 4377                 | 4311         | 4247         |      |              | 4059         |               | 3937         | 3878     | 3820         |
| 43       | 4719         | 4648         | 4579         |              | 4442         | 4376                 |              |              |      |              | 4057         |               | 3936         | 3877     | 3819         |
| 44       | 4718         | 4647         | 4578         | 4509         |              | 4375                 | 4309         | 4245         | 4181 | 4118         | 4056         | 3 <b>9</b> 96 | 3935         | 3876     | 3818         |
| 45       | 4717         | 4646         | 4577         | 4508         |              |                      | 4308         | 4244         | 4180 | 4117         | 4055         | 3995          | 3934         | 3875     | 3817         |
| 46       | 4716         | 4645         | 4575         | 4507         | 4439         | 4372                 |              |              |      |              | 4054         |               |              |          |              |
| 47       | 4715         | 4644         | 4574         |              | 4438         | 4371                 |              |              |      |              | 4053         |               |              | 3873     |              |
| 48       | 4714         | 4643         | 4573         | 4505         | 4437         | 4370                 | 4305         |              |      |              | 4052         |               |              | 3872     | 3814         |
| 49       | 4712         | 4641         | 4572         | 4503         | 4436         | 4369                 | 4304         | 4239         | 4176 | 4113         | 4051         | 3990          | 3930         | 3871     | 3818         |
| 50       | 4711         | 4640         | 4571         | 4509         | 4445         | 4969                 | 4902         | 4999         | 4175 | 4110         | 4050         | 3080          | 9090         | 9870     | 3810         |
| 51       |              |              |              |              |              |                      |              |              |      |              | 4049         |               |              |          |              |
| 52       | 4700         | 4638         | 4568         | 4500         | 4439         | 4366                 | 4300         | 4936         | 4179 | 4110         | 4048         | 9087          | 3027         | 8868     | 3810         |
| 53       | 4708         | 4637         | 4567         | 4400         | 4491         | 4965                 | 4200         | 4935         | 4170 | 4100         | 4048<br>4047 | 3006          | 9096         | 9967     | 2010         |
| 54       | 4707         | 4636         | 4566         | 4409         | 4430         | 4364                 | 4908         | 4994         | 4171 | 4108         | 4046         | 3085          | 3925         | 3866     | 3808         |
| 55       | 4705         | 4634         | 4565         | 4496         | 4490         | 4369                 | 4207         | 4999         | 4160 | 4107         | 4045         | 3094          | 3094         | 3865     | 5807         |
| 56       | 4704         | 4699         | 4564         | 4404         | 4499         | 4960                 | 4906         | 4990         | 4169 | 4106         | 4044         | 9099          | 2000         | 3964     | 9806         |
| 57       | 4703         | 4639         | 4563         | 4404         | 4497         | 4361                 | 4205         | 4991         | 4167 | 4105         | 4043         | 3020          | 3020         | 9864     | 3805         |
| 58       | 4709         | 4631         | 4561         | 4409         | 4496         | 4950                 | 4904         | 499N         | 4166 | 4104         | 4042         | 9021          | 3001         | ୍ ସହନ୍ଦ  | 3804         |
| 59       | 4700         | 4630         | 4560         | 4499         | 4425         | 4358                 | 4209         | 4220         | 4165 | 4109         | 4041         | 3980          | 3990         | 3861     | 3803         |
|          |              | ~~~          |              |              |              |                      |              |              |      | ·            |              |               |              |          |              |
| اا       | 0/           | 1/           | 2'           | 3′           | 4            | 5'                   | 6'           | 7'           | 8′   | 91           | 10/          | 11'           | 12'          | 15'      | 14           |
|          |              |              |              |              |              | -                    | 77           |              |      |              |              |               |              |          |              |

TABLE XLI.

|      |      |              |      |              |              |       | <del></del>       |       |                |       |           |      |            |       | <del></del> |
|------|------|--------------|------|--------------|--------------|-------|-------------------|-------|----------------|-------|-----------|------|------------|-------|-------------|
| ,    |      |              |      |              |              | 1 DE  | GREE,             | or 1  | Hov            | R.    |           |      |            |       |             |
| Sec. | 15'  | 16'          | 17"  | 18'          | 19/          | .50   | 21/               | 22/   | 23/            | 24'   | 25'       | 26'  | 27'        | 28'   | 29'         |
|      |      |              |      |              |              |       |                   |       |                |       |           |      |            |       |             |
| 0    | 3802 | 3745         | 3688 | <b>3</b> 632 | 3576         | 3522  | 3468              | 3415  | 3362           | 3310  | 3259      | 3208 | 3158       | 3108  | 3059        |
| 1    | 3801 | 3744         | 3687 | 3631         | 3575         | 3521  | 3467              | 3414  | 3361           | 3309  | 3258      | 3207 | 3157       | 3107  | 3058        |
| 2    | 3800 | 3743         | 3686 | 3630         | 3574         |       |                   |       |                | 8308  | 3257      | 3206 |            | 1     | 3057        |
| 1 .1 |      |              |      |              |              | 3520  | 3466              | 3413  | 3360           | 1 1   |           |      | 3156       | 3106  |             |
| 3    | 3799 | 3742         | 3685 | 3629         | 3574         | 3519  | 3465              | 3412  | 3359           | 3307  | 3256      | 3205 | 3155       | 3105  | 3056        |
| 4    | 3798 | 3741         | 3684 | 3628         | 3573         | 3518  | 3464              | 3411  | 3358           | 3306  | 3255      | 3204 | 3154       | 3105  | 3056        |
| 5    | 3797 | 3740         | 3683 | 3627         | 3572         | 3517  | 3463              | 3410  | 3358           | 3306  | 3254      | 3203 | 3153       | 3104  | 3055        |
| 6    | 3796 | 3739         | 3682 | 3626         | 3571         | 3516  | 3463              | 3409  | 3357           | 3305  | 3253      | 3203 | 3153       | 3103  | 3054        |
| 7    | 3795 |              | 3681 | 3625         | 3570         |       | 3462              |       | 3356           | 3304  | 3253      | 3202 |            | 3102  |             |
| 8    |      |              |      |              |              | 3515  |                   | 3408  |                |       |           |      | 3152       |       |             |
|      | 3794 |              | 3680 | 3624         | 3569         | 3514  | 3461              | 3407  | 335 <b>5</b>   | 3303  | 3252      | 3201 | 3151       | 3101  | 3052        |
| 9    | 3793 | 3736         | 3679 | 3623         | 3568         | 3514  | 3460              | 3407  | 3354           | 3302  | 3251      | 3200 | 3150       | 3101  | 3052        |
|      | 070  |              | 2050 |              |              |       |                   |       |                |       |           |      |            |       | 2051        |
| 10   | 3792 |              | 3678 | 3622         | 3567         | 8513  | 3459              | 3406  | 3353           | 3301  | 3250      | 3199 | 3149       | 3100  |             |
| 11   | 3791 | 3734         | 3677 | 3621         | 3566         | 3512  | 3458              | 3405  | 3352           | 3300  | 3249      | 3198 | 3148       | 3099  | 3050        |
| 12   | 3791 | 3733         | 3677 | 3621         | 3565         | 3511  | 3457              | 3404  | 3351           | 3300  | 3248      | 3198 | 3148       | 3098  | 3049        |
| 13   | 3790 | 5732         | 3676 | 3620         | 3564         | 3510  | 3456              | 3403  | 3351           | 3299  | 3247      | 3197 | 3147       | 3097  | 3048        |
| 14   | 3789 | 3731         | 3675 |              | 3563         |       |                   |       |                | 3298  | 3247      |      | 1          | 1     |             |
|      |      |              |      |              |              | 3509  | 3455              | 3402  | \$3 <b>5</b> 0 |       |           | 3196 | 3146       |       | 1           |
| 15   | 3788 | 3730         | 3674 |              | 3563         | 3508  | <b>34</b> 54      | 3401  | 3349           | 3297  | 3246      | 3195 | 3145       | 3096  |             |
| 16   | 3787 | 3729         | 3673 | 3617         | 3562         | 3507  | 3454              | 3400  | 3348           | 3296  | 3245      | 3194 | 3144       | 3095  |             |
| 17   | 3786 | 3728         | 3672 | 3616         | 3561         | 3506  | 3453              | 3400  | 3347           | 3295  | 3244      | 3193 | 3143       |       |             |
| 18   | 8785 | 3727         | 3671 | 3615         | 3560         | 3506  | 3452              |       | 3346           | 3294  | 3243      | 3193 | 3148       | 3099  |             |
| 19   | 3784 | 3726         | 3670 | 3614         | 3559         | 3505  |                   | 3398  | 3345           | 3294  | 3242      |      |            |       | 1           |
|      |      | 5.20         | 55,0 | J./1 1       | 0003         | 3303  | 3 <del>1</del> 31 | ,0090 | 5545           | 3294  | 0442      | 8192 | 3142       | 3092  | 10020       |
| 20   | 3783 | 3725         | 3669 | 3613         | 3558         | 3504  | 3450              | 3397  | 3344           | 3293  | 3241      | 3191 | 3141       | 3091  | 3043        |
| 21   | 3782 | 3725         | 3668 | 3612         | 3557         | 3503  |                   |       | 3344           |       |           |      |            |       | 3042        |
| 22   |      |              |      |              |              |       | 3449              |       |                | 3292  | 3241      | 3190 | 3140       |       | 1           |
|      |      | 3724         | 3667 | 3611         | 3556         | 3502  | 3448              | 3395  | 3343           | 3291  | 3240      | 3189 | 3139       | 3090  |             |
| 23   | 3780 | 3723         | 3666 | 3610         | 3555         | 3501  | 3447              | 3394  | 3342           | ,3290 | 3239      | 3188 | 3138       | 3089  |             |
| 24   | 3779 | 3722         | 3665 | 3610         | 355 <b>5</b> | 3.500 | 3446              | 3393  | 3341           | 3289  | 3238      | 3188 | 3138       | 3088  | 3039        |
| 25   | 3778 | 3721         | 3664 | 3609         | 3554         | 3499  | 3445              | 8393  | 3340           |       | 3237      | 3187 | 3137       | 3087  | 3038        |
| 26   | 3777 | 3720         | 3663 | 3608         | 3553         | 3498  | 3445              | 3392  |                | 3287  | 3236      |      |            |       |             |
| 27   | 3776 |              |      |              |              |       |                   | 1     |                |       |           | 3186 | 31.36      |       | 1'          |
|      |      | 3719         | 3663 | 3607         | 3552         | 3497  | 3444              | 3391  | 3338           | 5287  | 3236      | 3185 | 31,35      | 3086  |             |
| 28   | 3775 | 3718         | 3662 |              | 3551         | 3496  | 3443              |       | 3338           | 3286  | 3235      | 3184 | 3134       | 3085  | 3036        |
| 29   | 3774 | 3717         | 3661 | 3605         | 3550         | 3496  | 8442              | 3389  | 3337           | 3285  | 3234      | 3183 | 3133       | 3084  | 3035        |
|      |      |              |      |              |              |       |                   |       |                |       |           |      | <u> </u> - |       | <b> </b>    |
| 30   | 3773 | 3716         | 3660 | 3604         | 3549         | 3495  | 3441              | 3388  | 3336           | 3284  | 3233      | 3183 | 3133       | 3083  | 3034        |
| 31   | 3772 | 3715         | 3659 | 3603         | 3548         | 3494  | 3440              | 3387  | 3335           | 3283  | 3232      | 3182 | 3132       | 3082  | 3034        |
| 32   | 3771 | 3714         | 3658 | 3602         | 3547         | 3493  | 3439              | 3386  | 3334           | 3282  | 3231      | 3181 | 3131       | 3082  | 3033        |
| 33   | 3770 | 3713         | 3657 | 3601         | 3546         | 3492  | 3438              | 3386  | 3333           | 3282  | 3231      | 3180 | 3130       |       | 3032        |
| 34   | 3769 | 3712         | 3656 | 3600         |              |       |                   |       | •              |       |           |      |            |       | 5031        |
| 35   | 1    |              |      |              | 3545         | 3491  | 3438              | 3385  | 3332           | 3281  | 3230      | 3179 | 3129       | 3080  | 1           |
| 1 :  | 3768 | 3711         | 3655 | 3599         | 3544         | 3490  | 3437              | 3384  | 3331           | 3280  | 3229      | 3178 | 3128       | 3079  | 3030        |
| 36   | 3768 | 3710         | 3654 | 3598         | 3544         | 3489  | 3436              | 3383  | 3331           | 3279  | 3228      | 3178 | 3128       | 3078  | 3030        |
| 37   | 3767 | 3709         | 3653 | 3597         | 3543         | 3488  | 3435              | 3382  | 3330           | 3278  | 3227      | 3177 | 3127       | 3078  | 3029        |
| 38   | 3766 | 3708         | 3652 | 3596         | 3542         | 3487  | 3434              | 3381  | 3329           | 3277  | 3226      | 3176 | 3126       | 3077  | 3028        |
| 39   | 3765 | 3708         | 3651 | 3596         | 3541         | 3487  | 3433              | 3380  | 5328           | 3276  | 3225      | 3175 |            |       |             |
|      |      |              | 7001 |              | 0071         |       | 0 200             | 0000  | 0020           | 3210  | 3,223     | 3113 | 3125       | 3076  | 10001       |
| 40   | 3764 | 3707         | 3650 | 3595         | 3540         | 3486  | 3432              | 3379  | 3327           | 3276  | 3225      | 3174 | 3124       | 3075  | 3026        |
| 41   | 3763 | 3706         | 3649 |              | 3539         | 9485  | 3431              | 8378  | 3326           | 3275  | 3223      | 3173 | 3123       | 3074  |             |
| 42   | 3762 | 3705         | 3649 |              | 3538         | 3484  | 3431              | 3378  |                |       |           |      |            |       | 3025        |
| 43   |      |              |      |              |              |       |                   |       | 3325           | 3274  | 3223      | 3173 | 31,23      | 807,3 |             |
| , ,  | 3761 | 3704         | 3648 |              | 3537         | 3483  |                   | 3377  | 3325           | 3273  | 3222      | 3172 | 3122       | 3073  | 3024        |
| 44   | 3760 | 3703         | 3647 | 3591         | 3536         | 3482  | 3429              | 3376  | 3324           | 3272  | 3221      | 3171 | 3121       | 3072  | 3023        |
| 45   | 3759 | 3702         | 3646 | 3590         | 3535         | 3481  | 3428              | 3375  | 3323           | 3271  | 3220      | 3170 | \$120      | 3071  | 3022        |
| 46   | 3758 | 3701         | 3645 | 3589         | 3534         | 3480  | 3427              | 3374  | 3322           |       | 3219      | 3169 | 3119       | 3070  | 3022        |
| 47   | 3757 | 3700         | 3644 |              | 3533         | 3479  | 3426              | 3373  | 3321           | 3270  | 3219      | 3168 | 3119       | 3069  | 3021        |
| 48   | 3756 | 3699         | 3643 | 3587         | 3533         | 3479  | 3425              |       | 3320           |       |           |      |            | 3069  | 3020        |
| 49   |      |              |      |              |              |       |                   | 3372  |                | 3269  | 3218      | 3168 | 31.18      |       |             |
| -17  | 3755 | 3698         | 3642 | 3586         | 3532         | 3478  | 3424              | 8371  | 8819           | 3268  | 3217      | 3167 | 3117       | 3068  | 3019        |
| 50   | 3754 | 3697         | 9641 | 9595         | 9501         | QATT  | 0400              | 3371  | 6010           | OUCE  | 0016      | 0100 | 0115       | 0007  | 3018        |
| 1 1  |      |              | 3641 | 3585         | 3531         | 3477  | 3423              |       | 5318           |       | 3216      | 3166 |            | 3067  |             |
| 51   |      |              | 3640 |              |              | 3476  | 3423              | 33,70 | 3318           | 3266  | 3215      | 3165 | SI 15      | 3066  |             |
| 52   | 3752 |              | 3639 | 3584         | 3529         | 3475  | 3422              | 3369  | 3317           | 3265  | 3214      | 3164 | 3114       | 3065  |             |
| 53   | 3751 | 3694         | 3638 | 3583         | 3528         | 3474  | 3421              | 3368  | 3316           | 3264  | 3214      |      | 3114       |       | 3016        |
| 54   | 3750 | 3693         |      | 3582         |              | 3473  |                   |       |                | 3264  |           | 3163 |            |       |             |
| 55   | 3749 |              |      | 3581         | 3526         |       | 3419              |       |                | 3263  |           |      | 3112       | - 1   | 3014        |
| 56   |      | 3691         |      |              |              |       |                   |       |                |       |           |      |            |       | 3018        |
|      |      |              |      | 9580         |              | 3471  |                   |       |                | 3262  |           |      |            |       |             |
| 57   |      | 3691         |      | 3579         | 3525         |       | 3417              |       |                | 3261  |           |      | 3110       |       | 3013        |
| 58   |      | ਤ6 <b>90</b> |      | 3578         |              | 3470  |                   |       |                | 3260  | 3209      | 3159 | 3109       |       | 3012        |
| 59   | 3745 | 3689         | 3633 | 3577         | 5523         | 3469  | 3415              | 3363  | 3311           | 3259  | 3209      | 3158 | 3109       | 3060  | 3011        |
|      |      |              |      |              |              |       |                   |       |                |       |           |      |            |       | -001        |
|      | 15'  | 16/          | 17/  | 18/          | 19'          | 504   | 21'               | 22'   | 23'            | 24    | 25'       | 26'  | 27'        | 28'   | 29'         |
|      |      |              |      |              |              |       |                   |       |                |       | - <u></u> |      |            |       |             |

TABLE XLI.
PROPORTIONAL LOGARITHMS.

|          |                   |                     |   |  |                     | 1 DE         | GREE,               | OR 1                | Hous         | R.           |              |                     |              |              |               |
|----------|-------------------|---------------------|---|--|---------------------|--------------|---------------------|---------------------|--------------|--------------|--------------|---------------------|--------------|--------------|---------------|
| Sec.     | 30'               | 31                  | 321                                       | 33/  | 34                  | 35'          | 36'                 | 37/                 | 38/          | 39'-1        | 40'          | 41/                 | 42/          | 43'          | 44            |
| 0        | 3010              | 2962                | 2915                                      | 2868   | 2821                | 2775         | 2730                | 2685                | 2640         | 2596         | 2558         | 2510                | 2467         | 2424         | 2382          |
| 1        | 3009              | 2961                | 2914                                      | 2867   | 2821                | 2775         | 2729                | 2684                | 2640         | 2596         | 2552         | 2509                | 2466         | 2424         | 2382          |
| 2        | 3009              | 2961                | 2913                                      | 2866   | 2820                | 2774         | 2728                | 2683                | 2639         | 2595         | 2551         | 2508                | 2465         | 2423         | 2381          |
| 3        | 3008              | 2960                | 2912                                      | 2866   | 2819                | 2778         | 2728                | 2683                | 2638         | 2594         | 2551         | 2507                | 2465         | 2422         | 2380          |
| 4        | 9007              | 2959                | 2912                                      | 2865   | 2818                | 2772         | 2727                | 2682                | 2637         | 2593         | 2550         | 2507                | 2464         | 2421         | 2380          |
| 5        | 3006              | 2958                | 2911                                      | 2864   | 2818                | 2772         | 2726                | 2681                | 2687         | 2593         | 2549         | 2506                | 2463         | 2421         | 2379          |
| 6        | 8005              | 2958                | 2910                                      | 2863   | 2817                | 2771         | 2725                | 2681                | 2636         | 2599         | 2548         | 2505                | 2462         | 2420         | 2378          |
| -7       | 3005              | 2957                | 2909                                      | 2862   | 2816                | 2770         | 2725                | 2680                | 2635         | 2591         | 2548         | 2504                | 2462         |              | 2378          |
| 8        | 3004              | 2956                | 2908                                      | 2862   | 2815                | 2769         | 2724                | 2679                | 2634         | 2590         | 2547         | 2504                | 2461         | 2419         | 2377          |
| 9        | 3003              | 2955                | 2908                                      | 2861   | 2815                | 2769         | 2723                | 2678                | 2634         | 2590         | 2546         | 2503                | 2460         | 2418         | 2376          |
| 10       | 3002              | 2954                | 2907                                      | 2860   | 2814                | 2768         | 2722                | 2678                | 2633         | 2589         | 2545         | 2502                | 2460         | 2417         | 2375          |
| 11       | 3001              | 2954                | 2906                                      | 2859   | 2813                | 2767         | 2722                | 2677                | 2632         | 2588         | 2545         | 2502                | 2459         | 2417         | 2375          |
| 12       | 3001              | .2953               | 2905                                      | 2859   | 2812                | 2766         | 2721                | 2676                | 2632         | 2588         | 2544         | 2501                | 2458         | 2416         | 2374          |
| 13       | 3000              | 2952                | 2905                                      | 2858   | 2811                | 2766         | 2720                | 2675                | 2681         | 2587         | 2548         | 2500                | 2457         | 2415         | 2373          |
| 14       | 2999              | 2951                | 2904                                      | 2857   | 2811                | 2765         | 2719                | 2675                | 2630         | 2586         | 2548         | 2499                | 2457         | 2414         | 2373          |
| 15       | 2998              | 2950                | 2903                                      | 2856   | 2810                |              | 2719                | 2674                | 2629         | 2585         | 2542         | 2499                | 2456         | 2414         | 2372          |
| 16       | 2997              | 2950                | 2902                                      | 2855   | 2809                | 2763         | 2718                | 2673                | 2629         | 2585         | 2541         | 2498                | 2455         | 2413         | 2971          |
| 17       | 2997              | 2949                | 2901                                      | 2855   | 2808                | 2762         | 2717                | 2672                | 2628         | 2584         | 2540         |                     | 2455         | 2412         | 2371          |
| 18       | 2996<br>2995      | 2948<br>2947        | 2901<br>2900                              | 2854<br>2853   | 2808<br>2807        | 2762<br>2761 | 2716<br>2716        | 2672<br>2671        | 2627<br>2626 | 2583<br>2582 | 2540<br>2539 | 2497<br>2496        | 2454<br>2453 | 2412<br>2411 | 2370<br>2369  |
| -        | 2995              | 2041                | 2900                                      | 2000   | 2007                | 2701         | 2710                | 2011                | 2020         | 2002         | 2009         | 2490                | 2433         | 2411         | 2309          |
| 20       | 2994              | 2946                | 2899                                      | 2852   | 2806                | 2760         | 2715                | 2670                | 2626         | 2582         | 2538         | 2495                | 2452         | 2410         | 2568          |
| 21       | 2993              | 2946                | 2898                                      | 2852   | 2805                | 2760         | 2714                | 2669                | 2625         | 2581         | 2538         | 2494                | 2452         | 2410         | 2368          |
| 22<br>23 | 2993              | 2945                | 2898                                      | 2851   | 2804                | 27.59        | 2713                | 2669                | 2624         | 2580         | 2537         | 2494                |              | 2409         | 2367          |
| 23       | 2992              |                     | 2897                                      | 2850   | 2804                | 2758         | 2715                | 2668                | 2623         | 2580<br>2579 | 2536         | 2493                | 2450         | 2408         | 2366          |
| 25       | 2991<br>2990      | 2943<br>2942        | 2896<br>2895                              | 2849   | 2803<br>2802        | 2757<br>2756 | 2712                | 2667<br>2666        | 2623<br>2622 | 2578         | 2535<br>2535 | 2492<br>2492        | 2450<br>2449 | 2408         | 2366<br>2365  |
| 26       | 2989              | 2942                | 2894                                      | 2848<br>2848   | 2801                | 2756         | 2710                | 2666                | 2621         | 2577         | 2534         | 2491                | 2448         | 2406         | 2364          |
| 27       | 2989              | 2941                | 2894                                      | 2847   | 2801                | 2755         | 2710                | 2665                | 2621         | 2577         | 2533         | 2490                | 2448         | 2405         | 2364          |
| 28       | 2988              | 2940                | 2893                                      | 2846   | 2800                | 2754         | 2709                | 2664                | 2620         | 2576         | 2532         | 2489                | 2447         |              | 2363          |
| 29       | 2987              | 2939                | 2892                                      | 2845   | 2799                | 27.53        | 2708                | 2663                | 2619         | 2575         | 2532         | 2489                | 2446         | 2404         | 2362          |
| 30       | 2986              | 2939                | 2891                                      | 0045   | 9700                | OFFO         | 2707                | 2663                | 0610         | 2574         | 2531         | 2488                | 2445         | 2403         | 0000          |
| 31       | 2985              | 2938                | 2890                                      | 2845<br>2844   | 2798<br>2798        | 2753<br>2752 | 2707<br>2707        | 2662                | 2618<br>2618 | 2574         | 2530         | 2487                | 2445         | 2403         | 2362<br>2361  |
| 32       | 2985              | 2937                | 2890                                      | 2843   | 2797                | 2751         | 2706                | 2661                | 2617         | 2573         |              | 2487                | 2444         | 2402         | 2360          |
| 33       | 2984              | 2936                | 2889                                      | 2842   | 2796                | 2750         | 2705                | 2660                | 2616         | 2572         | 2529         | 2436                | 2443         | 2401         | 2359          |
| 34       | 2983              | 2935                | 2888                                      | 2841   | 2795                | 2750         | 2704                | 2660                | 2615         | 2572         | 2528         | 2485                | 2443         | 2400         | 2359          |
| 35       | 2982              | 2934                | 2887                                      | 2841   | 2795                |              | 2704                | 2659                | 2615         | 2571         | 2527         | 2484                | 2442         | 2400         | 2358          |
| 86       | 2981              | 2934                | 2887                                      | 2840   | 2794                | 2748         | 2703                | 2658                | 2614         | 2570         | 2527         | 2484                | 2441         | 2399         | 2357          |
| 37       | 2981              | 2933                | 2886                                      | 2839   | .2793               | 2747         | 2702                | 2657                | 2613         | 2569         | 2526         | 2488                | 2440         | 2398         | 2357          |
| 38       | 2980              | 2932                | 2885                                      | 2838   | ,2792               | 2747         | 2701                | 2657                | 2612         | 2569         | 2525         | 2482                | 2440         | 2398         | 2356          |
| 39       | 2979              | 2931                | 2884                                      | 2838   | 2792                | 2746         | 2701                | 2656                | 2612         | 2568         | 2525         | 2482                | 2439         | 2397         | 2355          |
| 40       | 2978              | 2931                | 2883                                      | 2837   | 2791                | 2745         | 2700                | 2655                | 2611         | 2567         | 2524         | 2481                | 2438         | 2396         | 2855          |
| 41       | 2977              | 2930                | 2883                                      | 2836   | 2790                | 2744         | 2699                | 2654                | 2610         | 2566         | 2523         | 2480                | 2438         | 2396         | 2354          |
| 42       | 2977              | 2929                | 2882                                      | 2835   | 2789                | 2744         | 2698                | 2654                | 2610         | 2566         | 2522         | 2480                | 2437         | 2395         | 2858          |
| 43       | 2976              | 2928                | 2881                                      | 2834   | 2788                | 2743         | 2698                | 2653                | 2609         | 2565         |              | 2479                | 2436         | 2394         | 2353          |
| 44       | 2975              | 2927                | 2880                                      | 2834   | 2788                | 2742         | 2697                | 2652                | 2608         | 2564         |              | 2478                | 2436         | 2394         | 2352          |
| 45       | 2974              | 2927                | 2880                                      |  | 2787                | 2741         | 2696                | 2652                | 2607         | 2564         | 2520         | 2477                | 2435         | 2393         | 2251          |
| 46       | 2973              | 2926                | 2879                                      | 2832   | 2786                | 2741         | 2695                | 2651                | 2607         | 2563         | 2320         | 2477                | 2434         | 2392         | 2350          |
| 47       | 2973              | 2925                | 2878                                      | 2831   | 2785                | 2740         | 2695                | 2650                | 2606         |              | 2519         | 2476                | 2433         | 2391         | 2850          |
| 48       | 2972              | 2924                | 2877                                      | 2831   | 2785                | 2739         | 2694                | 2645                | 2605         | 2561<br>2561 | 2518<br>2517 | 2475                | 2433         | 2391<br>2390 | 2349          |
|          | 2971              | 111100              | 2876                                      | 2850   | 2784                | 2798         | 2693                | 2649                | 2604         | 2301         | 2517         | 2474                | 2432         | -            | 2348          |
| 50       |                   | 2928                | 2876                                      |  |                     |              | 2692                | 2648                |              |              |              |                     | 2461         | 2389         |               |
| 51       |                   | 2922                | 2875                                      |  |                     |              |                     | 2647                |              |              |              | 2473                |              |              |               |
| 59       |                   | 2921                |   |  |                     | 2736         |                     | 11.000.00           | 10000        | 2558         |              |                     |              |              |               |
| 53       |                   | 2920                |   |  |                     |              | 2690                |                     |              |              | 400000       | 2472                |              | 2387         |               |
| 54<br>55 |                   | 2920                |   |  | 2780                |              | 2689                |                     |              |              |              | 2471<br>2470        |              | 2387         | 2345          |
| 56       |                   | 2919                |   |  | 2779                |              |                     | 2644                |              | 2556         |              | 2470                |              |              | 100           |
| 57       |                   | 2918<br>2917        | 2871<br>2870                              |  | 2778<br>2778        |              | 2688<br>2687        | 2648<br>2648        |              |              |              | 2469                |              |              |               |
| 58       |                   | A                   | 4010                                      | 2024   |                     |              |                     |                     |              |              |              |                     |              |              |               |
| -        | The second second | 2016                | 9860                                      | 9999   | 9777                | 9791         | 2686                | 2640                | 9508         | 2554         | 2511         | 9468                | 20.95        | 2334         | 2500          |
| 59       | 2964              |                     | 2869<br>2869                              | B1 - 100 - 1 |                     | 2731<br>2731 | 2686<br>2686        | 2649<br>2641        | 2598<br>2597 |              |              |                     |              |              | 100           |
| 59       | 2964<br>2963      | 2916<br>2916<br>31' | 1 - A - C - C - C - C - C - C - C - C - C | 2822   | 2777<br>2776<br>34' |              | 2686<br>2686<br>36' | 2642<br>2641<br>37' | 2597         | 2553         | 2510         | 2468<br>2467<br>41' | 2425         | 2383         | 2342 2341 44' |

TABLE XLI.

PROPORTIONAL LOGARITHMS.

|          |              |              |              |              |             | 1 DE         | GREE         | or I             | Hou          | R.           |              |              |                     |              |                      |
|----------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|------------------|--------------|--------------|--------------|--------------|---------------------|--------------|----------------------|
| Sec.     | 45'          | 46'          | 47/          | 48'          | 49/         | 50'          | 51'          | 521.             | 53'          | 54           | 55'          | 56′          | 57'                 | 58′          | . 59'                |
| 0        | 2341         | 2300         | 2259         | 2218         | 2178        | 2139         | 2099         | 2061             | 2022         | 1984         | 1946         | 1908         | 1871                | 1834         | 1797                 |
| 1        | 2340         |              | 2258         | 2218         |             | 2138         |              | 2060             | 2021         | 1983         | 1945         |              |                     | 1833         | 1797                 |
| 2        | 2339         | 2298         | 2257         | 2217         | 2177        | 2137         | 2098         | 2059             | 2021         | 1982         | 1944         | 1907         | 1870                | 1833         | 1796                 |
| 3        |              | 2298         | 2257         |              | 2176        |              | 2098         | 2059             | 2020         | -            | 1944         |              | 1869                |              | 1795                 |
| 4        | 2338         |              | 2256         |              |             | 2136         | 2097         | 2058             |              |              | 1948         |              |                     | 1831         | 1795                 |
| 5        | 2337         | 2296         | 2255         | 2215         |             |              | 2096         | 2057             | 2019         | 1980         |              |              | 1868                |              | 1794                 |
| 6        | 2337<br>2336 | 2296<br>2295 | 2255         | 2214         |             |              | 2096<br>2095 | 2057             | 2017         | 1980         | 1942         |              | 1867                |              | 1794                 |
| 8        | 2335         | 2293         | 2254<br>2253 | 2214<br>2213 |             | 2134<br>2133 | 2093         | 2055             |              | 1979<br>1979 | 1941         | 1904         | $\frac{1867}{1866}$ |              | 1793<br>1792         |
| 9        | 2835         | 2294         | 2258         | 2212         |             | 2133         | 2094         | 2055             |              | 1978         |              | 1903         |                     | 1828         | 1792                 |
|          |              |              |              |              |             |              |              |                  |              |              |              |              |                     |              |                      |
| 10<br>11 | 2334<br>2333 | 2293         | 2252         | 2212         | 2172        | 2132         | 2093<br>2092 | 2054             | 2016         |              | 1939         |              | 1865                |              | 1791                 |
| 12       | 2333         | 2292<br>2291 | 2251<br>2251 | 2211<br>2210 |             | 2132<br>2131 | 2092         | 2053<br>2053     | 2015<br>2014 |              | 1939<br>1938 | 1901<br>1901 |                     |              | 1791<br>1790         |
| 13       | 2332         | 2291         | 2250         | 2210         |             | 2130         | 2091         | 2052             |              |              |              |              | 1863                |              | 1789                 |
| 14       | 2331         | 2290         | 2249         | 2209         |             |              | 2090         | 2051             | 2013         |              |              |              |                     |              | 1789                 |
| 15       | 2831         | 2289         | 2249         | 2208         |             | 2129         | 2090         | 2051             | 2012         |              |              |              | 1862                |              | 1788                 |
| 16       | 2330         | 2289         | 2248         | 2208         | 2168        | 2128         | 2089         | 2050             | 2012         |              | 1936         |              |                     | 1824         |                      |
| 17       | 2329         | 2288         | 2247         | 2207         |             |              | <b>20</b> 88 | 2050             |              | 1973         | 1935         | 1898         | 1860                |              | 1787                 |
| 18       | 2328         | 2287         | 2247         | 2206         | 2157        | 2127         | 2088         | 2049             | 2010         |              | 1934         | 1897         |                     |              | 1786                 |
| 19       | 2328         | 2287         | 2246         | 2206         | 2166        | 2126         | 2087         | 2048             | 2010         | 1972         | 1934         | 1896         | 1859                | 1822         | 1786                 |
| 20       | 2327         | 2286         | 2245         | 2205         | 2165        | 2126         | 2086         | 2048             | 2009         | 1971         | 1933         | 1896         | 1858                | 1822         | 1785                 |
| 21       | 2326         | 2285         | 2245         |              | 2165        | 2125         | .2086        | 2047             | 2009         |              | 1933         |              |                     | 1821         | 1785                 |
| 22       | 2326         | 2285         | 2244         |              | 2164        | 2124         | 2085         |                  | 12008        | 1970         | 1932         |              | 1857                |              | 1784                 |
| 23       | 2325         | 2284         | 2243         |              | 2163        | 2124         | 2084         | 2046             |              | 1969         |              |              |                     | 1820         | 1783                 |
| 24       | 2324         | 2283         | 2243         |              | 2163        |              |              | 2045             | 2007         |              |              |              |                     | 1819         | 1783                 |
| 25<br>26 | 2324<br>2323 | 2283         | 2242<br>2241 |              |             | 2132         | 2083         | 2044             |              |              |              |              | 1855                |              | 1782                 |
| 27       | 2323         | 2282<br>2281 | 2241         | 2201<br>2200 |             | 2122<br>2121 | 2083<br>2082 | 2044<br>2043     |              |              |              |              |                     | 1818<br>1817 | 1781                 |
| 28       | 2322         | 2281         | 2240         |              |             | 2120         | 2081         | 2042             | 2003         |              |              |              |                     | 1817         | 1781<br>1 <b>780</b> |
| -29      | 2321         | 2280         |              | 2199         |             |              | 2081         | 2042             | 2004         |              | 1927         |              |                     | 1816         | 1780                 |
| 30       | OGUN         | 0070         | 0000         | 0100         | 01.50       |              |              | 9041             |              |              |              |              |                     |              |                      |
| 30<br>31 | 2320<br>2319 | 2279<br>2279 | 2239<br>2238 | 2198<br>2198 |             | 2119<br>2118 | 2080<br>2079 | 2041<br>2041     |              | 1965         | 1927         |              | 1852                |              |                      |
| 32       | 2319         | 2278         | 2237         | 2197         |             |              | 2079         | 2040             | 2002<br>2001 |              |              |              |                     | 1815<br>1814 |                      |
| 33       | 2318         | 2277         | 2237         |              |             | 2117         | 2078         | 2039             |              | 1963         |              |              |                     | 1814         | 1777                 |
| 34       | 2317         | 2276         | 2236         |              |             | 2116         | 2077         | 2039             |              |              |              |              |                     | 1813         |                      |
| 35       | 2817         | 2276         | 2235         |              | 2155        | 2116         | 2077         | 2038             |              |              | 1924         |              |                     | 1812         |                      |
| 36       | 2316         |              | 2235         |              |             |              | 2076         | 2037             |              |              |              | 1886         | 1849                | 1812         | 1775                 |
| 37       | 2315         | 2274         | 2234         |              |             |              | 2075         | 2037             |              | 1960         |              |              | 1848                |              | 1775                 |
| 38       | 3315         | 2274         | 2233         | 2193         |             |              | 2075         | 2036             |              | 1960         | 1922         |              |                     |              | 1774                 |
| 39       | 2314         | 2273         | 2233         | 2192         | 2153        | 2113         | 2074         | 2035             | 1997         | 1959         | 1921         | 1884         | 1847                | 1810         | 1774                 |
| 40       | 2313         | 2272         | 2232         | 2192         | 2152        | 2113         | 2073         | 2035             | 1996         | 1958         | 1921         | 1883         | 1846                | 1809         | 1773                 |
| 41       | 2313         | 2272         | 2231         | 2191         |             | 2112         | 2073         | 2034             | 1996         | 1958         | 1920         | 1883         | 1846                | 1809         | 1772                 |
| 42       | 2312         | 2271         | 2231         |              | 2151        |              | 2072         | 2033             |              |              |              | 1882         |                     |              |                      |
| 43       | 2311         | 2270         | 2230         |              |             | 2111         | 2071         | 2033             |              |              |              |              |                     | 1808         |                      |
| 44       | 2311         |              | 2229<br>2229 |              | 2149 $2149$ | 2110         | 2071         | 903 <del>2</del> |              | 1956         |              |              | 1844                |              |                      |
| 46       | 2310<br>2309 | 2269<br>2268 | 2229         |              |             |              | 2070<br>2070 |                  |              | 1955<br>1955 |              |              |                     |              |                      |
| 47       | 2308         | 2268         | 2227         | 2187         |             |              | 2069         |                  |              | 1955         |              |              |                     |              | ,                    |
| 48       | 2308         | 2267         | 2227         | 2186         | 2147        | 2107         | 2068         | 2030             |              |              |              |              | 1841                |              |                      |
| 49       | 2307         |              | 2226         |              |             | 2107         | 2068         | 2029             |              | 1953         |              |              | 1841                |              |                      |
| 50       | 2306         | 2266         | 9995         | 2185         | 2143        | 2106         | 2067         | 9000             |              | I            |              | 1877         | 1840                | 1803         | L                    |
| 51       | 2306         | 2265         | 2225         | 2184         | 2145        | 2105         | 2066         | 2028             | 1980         | 1951         | 1914         | 1876         | 1890                | 1803         | 1767                 |
| 52       | 2305         | 2264         | 2224         | 2184         | 2144        | 2105         | 2066         | 2027             | 1989         | 1951         | 1913         | 1876         | 1839                | 1809         | 1766                 |
| 53       | 2304         | 2264         | 2223         | 2183         | 2143        | 2104         | 2065         | 2026             | 1988         | 1950         | 1912         | 1875         | 1838                | 1801         | 1765                 |
| 54       | 2304         | 2263         | 2223         | 2182         | 2143        | 2103         | 2064         | 2026             | 1987         | 1950         | 1912         | 1875         | 1838                | 1801         | 1765                 |
| 55       |              | 2262         | 2222         | 2182         | 2142        | <b>210</b> 3 | 2064         | 2025             | 1987         | 1949         | 1911         | 1874         | 1837                | 1800         | 1764                 |
| 56       | 2802         |              |              | 2181         |             |              |              | 2024             | 1986         | 1948         | 1911         | 1873         | 1836                | 1800         | 1763                 |
| 57       | 2802         |              | 2220         | 2180         | 2141        | 2101         | 2062         | 2024             | 1986         | 1948         | 1910         | 1873         | 1896                | 1799         | 1763                 |
| 58<br>59 | 2300         | 2260         | 9910         | 2179         | 9190        | 2101         | 2062         | 2023             | 1965         | 1947         | 1909         | 1072         | 1832                | 1798<br>1798 | 1                    |
|          |              |              |              |              |             |              |              |                  |              | 11           |              |              |                     | <u> </u>     | 1761                 |
|          | 45'          | 46'          | 47'          | 48/          | 49'         | 50/          | 51'          | 1 52             | 53           | 54           | 5 <b>5</b>   | 56'          | 57'                 | 58'          | 59                   |

|            | 1                    |              |              |              |              | DEG          | REES,        | OR 2         | Hou          | R S .        |              |              |              |              |              |
|------------|----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Sec.       | 0'                   | 1'           | 2/           | 3'           | 4.           | 5'           | 1 6'         | 7'           | 8            | 9/           | 1 10/        | 114          | 12'          | 13'          | 1-1/         |
|            |                      | 1505         |              |              |              |              |              |              |              | <u> </u>     | <u> </u>     |              |              |              | 1000         |
| 0          | 1761                 | 1725         | 1689         | 1654         | 1619         | 1584         | 1549<br>1548 | 1515         | 1481         | 1447<br>1446 | 1413<br>1413 | 1380         |              |              | 1282<br>1281 |
| 2          | 1760<br>1760         | 1724 $1724$  |              | 1653<br>1652 | 1618<br>1617 | 1583<br>1582 | 1548         | 1514<br>1514 | 1480<br>1479 | 1446         | 1419         | 1379<br>1379 | 1346<br>1346 |              | 1281         |
| 3          | 1759                 | 1723         |              | 1652         | 1617         | 1582         |              | 1513         | 1479         | 1445         |              | 1378         |              |              | 1280         |
| 4          | 1758                 | 1722         | 1687         | 1651         | 1616         | 1581         | 1547         | 1512         | 1478         | 1445         |              | 1378         |              |              | 1279         |
| 5          | 1758                 | 1722         | 1686         | 1651         | 1616         | 1581         | 1546         | 1512         | 1478         | 1444         |              | 1377         | 1344         |              | 1279         |
| 6          | 1757                 | 1721         | 1686         | 1650         | 1615         | 1580         |              | 1511         | 1477         | 1443         |              | 1377         | 1344         |              | 1278         |
| 7          | 1757                 | 1721         | 1685         | 1650         | 1614         | 1580         | 1545         | 1511         | 1477         | 1443         | 1409         | 1376         | 1343         | 1310         | 1278         |
| 8          | 1756                 | 1720         | 1684         | 1649         | 1614         | 1579         |              | 1510         | 1476         | 1442         |              | 1376         | 1343         |              | 1277         |
| 9          | 1755                 | 1719         | 1684         | 1648         | 1613         | 1578         | 1544         | 1510         | 1476         | 1442         | 1408         | 1375         | 1342         | 1309         | 1277         |
| 10         | 1755                 | 1719         | 1683         | 1648         | 1613         | 1578         | 1543         | 1509         | 1475         | 1441         | 1408         | 1374         | 1341         | 1309         | 1276         |
| 11         | 1754                 | 1718         | 1683         | 1647         | 1612         | 1577         | 1543         | 1508         | 1474         | 1441         |              | 1374         |              | 1308         | 1276         |
| 12         | 1754                 | 1718         | 1682         | 1647         | 1612         | 1577         | 1542         | 1508         | 1474         | 1440         | 1407         | 1373         | 1340         | 1308         | 1275         |
| 13         | 1753                 | 1717         | 1681         | 1646         | 1611         | 1576         |              | 1507         | 1473         | 1440         |              | 1373         | 1340         | 1307         | 1275         |
| 14         | 1752                 | 1716         | 1681         | 1645         | 1610         | 1575         |              | 1507         | 1473         | 1439         | 1405         | 1372         | 1339         | 1307         | 1274         |
| 15         | 1752                 | 1716         | 1680         | 1645         | 1610         | 1575         |              | 1506         | 1472         | 1438         |              | 1372         | 1339         | 1306         | 1274         |
| 16<br>17   | 1751                 | 1715         | 1680         | 1644         | 1609         | 1574         |              | 1506         | 1472         | 1438         |              | 1371         | 1338         | 1305         | 1273         |
| 18         | 1751<br>1750         | 1715         | 1679         | 1644         | 1609         | 1574         |              | 1505         | 1471         | 1437         |              | 1371         | 1388         | 1305         | 1272         |
| 19         | 1749                 | 1714<br>1713 | 1678<br>1678 | 1643<br>1642 | 1608<br>1607 | 1573<br>1573 | 1539<br>1538 | 1504<br>1504 | 1470<br>1470 |              | 1403<br>1403 | 1370<br>1369 | 1337<br>1337 | 1304<br>1304 | 1272<br>1271 |
|            |                      |              |              | 1042         |              |              |              | 1504         |              |              |              |              |              |              |              |
| 20         | 1749                 | 1713         | 1677         | 1642         | 1607         | 1572         | 1538         | 1503         | 1469         |              | 1402         | 1369         | 1336         | 1303         | 1271         |
| 21         | 1748                 | 1712         | 1677         | 1641         | 1606         | 1571         | 1537         | 1503         | 1469         |              | 1402         | 1368         | 1335         | 1303         | 1270         |
| 22<br>23   | 1748                 | 1712         | 1676         | 1641         | 1606         | 1571         | 1536         | 1502         | 1468         |              | 1401         | 1368         | 1335         | 1302         | 1270         |
| 24         | 1747<br>1746         | 1711<br>1711 | 1675         | 1640         | 1605         | 1570         | 1536<br>1535 | 1502         | 1468         |              | 1400         | 1367<br>1367 | 1334         | 1302<br>1301 | 1269         |
| 25         | 1746                 | 1710         | 1675<br>1674 | 1640<br>1639 | 1605<br>1604 | 1570<br>1569 | 1535         | 1501<br>1500 | 1467<br>1466 |              | 1399         | 1366         | 1334<br>1333 | 1301         | 1269<br>1268 |
| 26         | 1745                 | 1709         | 1674         | 1638         | 1603         | 1569         | 1534         | 1500         | 1466         |              | 1399         | 1366         | 1333         | 1300         | 1268         |
| 27         | 1745                 | 1709         | 1673         | 1638         | 1603         | 1568         | 1534         | 1499         | 1465         |              | 1398         | 1365         | 1332         | 1300         | 1267         |
| 28         | 1744                 | 1708         | 1673         | 1637         | 1602         | 1567         | 1533         | 1499         | 1465         |              | 1398         | 1365         | 1332         | 1299         | 1267         |
| 29         | 1743                 | 1708         | 1672         | 1637         | 1602         | 1567         | 1532         | 1498         | 1464         | 1431         | 1397         | 1364         | 1331         | 1298         | 1266         |
| 30         | 1743                 | 1707         | 1671         | 1636         | 1601         | 1566         | 1532         | 1498         | 1464         | 1430         | 1397         | 1363         | 1331         | 1298         | 1266         |
| 31         | 1742                 | 1706         | 1671         | 1635         | 1600         | 1566         | 1531         | 1497         | 1463         |              | 1396         | 1363         | 1330         | 1297         | 1265         |
| 32         | 1742                 | 1706         | 1670         | 1635         | 1600         | 1565         | 1531         | 1496         | 1463         |              | 1395         | 1362         | 1329         | 1297         | 1264         |
| 33         | 1741                 | 1705         | 1670         | 1634         | 1599         | 1565         | 1530         | 1496         | 1462         | 1428         | 1395         | 1362         | 1329         | 1296         | 1264         |
| 34         | 1740                 | 1705         | 1669         | 1634         | 1599         | 1564         | 1529         | 1495         | 1461         |              | 1394         | 1361         | 1328         | 1296         | 1263         |
| 35         | 1740                 | 1704         | 1668         | 1633         | 1598         | 1563         | 1529         | 1495         | 1461         | 1427         |              | 1361         | 1328         | 1295         | 1263         |
| 36<br>37   | 1739                 | 1703         | 1668         | 1633         | 1598         | 1563         | 1,528        | 1494         | 1460         |              | 1398         | 1360         |              | 1295         | 1262         |
| 38         | 1739<br>1738         | 1703<br>1702 | 1667         | 1632         | 1597         | 1562         | 1528<br>1527 | 1494         | 1460         | 1426         | 1393<br>1392 | 1360<br>1359 |              | 1294<br>1294 | 1262<br>1261 |
| 39         | 1737                 | 1702         | 1667<br>1666 | 1631<br>1631 | 1596<br>1596 | 1562<br>1561 | 1527         | 1493<br>1493 | 1459<br>1459 | 1425         |              | 1359         | 1326<br>1326 | 1293         | 1261         |
|            |                      |              |              |              |              |              |              |              |              |              |              |              |              | ;            |              |
| 40         | 1737                 | 1701         | 1665         | 1630         | 1595         | 1560         | 1526         | 1492         | 1458         | 1424         |              | 1358         | 1325         | 1292         | 1260         |
| 41         | 1736                 | 1700         | 1685         | 1630         | 1595         | 1560         | 1525         | 1491         | 1457         | 1424         | 1390         | 1857         | 1325         | 1292         | 1260         |
| 42<br>43   | 1736<br>173 <b>5</b> | 1700<br>1699 | 1664         | 1629         | 1594         | 1559         | 1525<br>1524 | 1491         | 1457         | 1423<br>1423 | 1390         | 1357         | 1924         | 1291         | 1259         |
| 44         | 1735                 | 1699         | 1664<br>1663 | 1628<br>1628 | 1593<br>1593 | 1559<br>1558 | 1524         | 1490<br>1490 | 1456<br>1456 | 1423         | 1389<br>1389 | 1356<br>1356 | 1323         | 1291         | 1258<br>1258 |
| 45         | 1734                 | 1698         | 1663         | 1627         | 1592         | 1558         | 1523         | 1489         | 1455         | 1422         | 1388         | 1355         | 1323         | 1290         | 1256         |
| 46         | 1733                 | 1697         | 1662         | 1627         | 1592         | 1557         | 1523         | 1489         | 1455         | 1421         | 1388         | 1355         | 1322         | 1289         | 1257         |
| 47         | 1733                 | 1697         | 1661         | 1626         | 1591         | 1556         | 1522         | 1488         | 1454         | 1420         | 1387         | 1354         | 1321         | 1289         | 1256         |
| 48         | 1732                 | 1696         | 1661         | 1626         | 1591         | 1556         | 1522         | 1487         | 1454         | 1420         | 1387         | 1354         | 1321         | 1288         | 1256         |
| 49         | 1731                 | 1696         | 1660         | 1625         | 1590         | 1555         | 1521         | 1487         | 1453         | 1419         | 1586         | 1353         | 1320         | 1288         | 1255         |
| 50         | 1731                 | 1695         | 1660         | 1624         | 1589         | 1555         | 1520         | 1486         | 1452         | 1419         | 1386         | 1352         | 1320         | 1287         | 1255         |
| 51         |                      |              | 1659         |              |              |              |              |              |              |              |              |              |              |              |              |
| 52         | 1730                 | 1694         | 1658         | 1623         | 1588         | 1554         | 1519         | 1485         | 1451         | 1418         | 1384         |              |              |              |              |
| 53         | 1729                 |              |              |              |              | 1553         | 1519         | 1485         | 1451         | 1417         | 1384         |              |              | 1285         |              |
| 54         | 1728                 |              |              |              | 1587         |              |              | 1484         |              |              |              |              |              | 1285         |              |
| 55         | 1728                 |              | 1657         |              |              |              |              |              |              |              | 1388         |              |              |              |              |
| 56<br>57   | 1727<br>1727         | 1691         | 1656<br>1655 |              | 1586         |              |              |              |              |              | 1382<br>1382 |              |              |              |              |
| <i>5</i> 8 | 1726                 | 1690         |              |              | 1585         |              | 1516         |              |              | 1413         |              |              | 1315         | 1283         |              |
| 59         | 1725                 |              | 1654         |              |              |              |              |              |              | 1418         |              | 1847         |              |              |              |
|            |                      |              |              |              |              | 1            | 6'           | 1            |              |              |              | :            |              |              |              |
|            | 0'                   | 1'           | 2/-          | 3'           | 4'           | 5′           | 67           | 71           | 8′           | 9'           | 10/1         | 11'          | 12'.         | 18/          | 14'          |

TABLE XLI.
PROPORTIONAL LOGARITHMS.

|            |              |              |              |              | 2            | DEGR         | EES, C       | OR 2         | Hour          | s.           |              |              |              |              |                              |
|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|--------------|--------------|------------------------------|
| ec.        | 15'          | 16/          | 17'          | 18′          | 19'          | 20′          | 21'          | 22           | 23'           | 24           | 25′          | 26′          | 27′          | 28′          | 29'                          |
| 0          | 1249         | 1217         | 1186         | 1154         | 1123         | 1091         | 1061         | 1030         | 0999          | 0969         | 0939         | 0909         | 0880         | 0850         | 0821                         |
| 1          | 1249         | 1217         |              | 1153         | 1122         | 1091         | 1060         |              | 0999          | 0969         | 0939         | 0909         |              | 0850         |                              |
| 2          | 1248<br>1248 |              | 1184         |              | 1121         | 1090         | 1059         |              | 0998          |              | 0938         | 0908<br>0908 | 0879<br>0878 | 0849<br>0849 |                              |
| 4          | 1247         | 1216<br>1215 |              | 1152<br>1152 | 1121         | 1090<br>1089 | 1059<br>1058 |              | 0998<br>0997  | 0967         | 0938<br>0937 | 0907         | 0878         | 0848         | 0819                         |
| 5          | 1247         | 1215         |              | 1151         | 1120         | 1089         | 1058         |              | 0997          | 0967         | 0937         | 0907         | 0877         | 0848         |                              |
| 6          | 1246         | 1214         |              | 1151         |              | 1088         | 1057         |              | 0996          |              |              | 0906         |              | 0847         |                              |
| 7          | 1246         | 1214         |              | 1150         |              | 1088         | 1057         |              | 0996          |              | 0936         | 0906         |              | 0847         |                              |
| 8 9        | 1245         | 1213         | 1181         |              | 1118         | 1087         | 1056         |              | 0995          | 0965         | 0935         | 0905<br>0905 | 0876<br>0875 | 0846<br>0846 |                              |
|            | 1245         | 1213         | 1181         | 1149         | 1118         | 1087         | 1056         | 1025         | 0995          | 0965         | 0935         |              |              |              | l                            |
| 10         | 1244         | 1212         | 1180         | 1149         |              | 1086         | 1055         | 1025         | 0994          |              | 0934         | 090 i        | 0875         | 0845         |                              |
| 11<br>12   | 1243<br>1243 | 1211         |              | 1148         |              |              | 1055         |              | 0994<br>0993  |              |              | 0904<br>0903 | 0874<br>0874 | 0845<br>0844 | 1                            |
| 13         | 1243         | 1211<br>1210 |              | 1148         |              | 1085         | 1054         |              | 0993          |              | 0933         | 0903         | l            | 0844         |                              |
| 14         | 1242         | 1210         |              | 1147         |              | 1084         |              |              | 0992          |              | 0932         | 0902         |              | 0843         | 6                            |
| 15         | 1241         | 1209         |              | 1146         |              |              | 1053         | 1022         | 0992          |              | 0932         | 0902         | 0872         | 0848         |                              |
| 16         | 1241         | 1209         |              | 1146         | 1114         |              |              |              | 0991          | 0961         | 0931         | 0901         | 0872         | 0842         |                              |
| 17<br>18   | 1240<br>1240 | 1378<br>1208 |              | 1145         | 1114         | 1083         | 1052<br>1051 | 1021<br>1021 | 0991          | 0961<br>0960 | 0931<br>0930 | 0901<br>0900 | 0871<br>0871 | 0842<br>0841 | 0813<br>0812                 |
| 19         | 1239         | 1207         | 1175         |              | 1113         | 1082         | 1051         | 1021         | 0990          | 0960         | 0930         | 0900         |              | 0841         | 0812                         |
|            |              |              |              |              |              |              |              |              |               |              |              |              |              |              | .—— I                        |
| 20<br>21   | 1239<br>1238 | 1207<br>1206 | 1175<br>1174 | 1143         | 1112         | 1081         | 1050<br>1050 |              | 0989<br>0989  |              | 0929<br>0929 | 0899<br>0899 | 0870<br>0869 | 0840<br>0840 |                              |
| 22         | 1238         | 1206         | 1174         | 1142         | 1111         | 1080         | 1049         |              | 0988          | ,            | 0928         | 0898         |              | 0839         | 0810                         |
| 23         | 1237         | 1205         | 1173         |              | 1111         | 1080         |              |              | Q988          |              | 0928         | 0898         | 0868         | 0839         |                              |
| 24         | 1237         | 1205         |              | 1141         | 1110         | 1079         |              |              | 0987          |              | 0927         | 0897         | 0868         | 0838         | 0809                         |
| 25         | 1236         | 1204         |              | 1141         | 1110         | 1079         | 1048         |              | 0987          | 0957         | 0927         | 0897         | 0867<br>0867 | 0838<br>0837 | 0809                         |
| 26<br>27   | 1235<br>1235 | 1203         | 1179         | 1140         | 1109         | 1078<br>1078 | 1047<br>1047 |              | 0986          |              | 0926<br>0926 | 0896<br>0896 | 0866         | 0837         | 0808<br>0808                 |
| 28         | 1234         | 1202         | 1171         | 1139         | 1108         | 1077         | 1046         |              | 0985          | 0955         | 0925         | 0895         | 0866         | 0836         | 0807                         |
| 29         | 1234         | 1202         | 1170         | 1139         | 1107         | 1076         | 1046         | 1015         | 0985          | 095 <b>5</b> | 0925         | 0895         | 0865         | 0836         | 0807                         |
| 30         | 1233         | 1201         | 1170         | 1138         | 1107         | 1076         | 1045         | 1015         | 0984          | 0954         | 0924         | 0894         | 0865         | 0835         | 0806                         |
| 31         | 1233         | 1201         |              | 1138         |              |              |              |              |               | -            |              | 0894         | 0864         | 0835         | 0806                         |
| 32         | 1232         | 1200         | - 1          | 1137         |              |              | 1044         |              | 0983          |              | 0923         | 0893         | 0864         | 0834         | 0805                         |
| 33<br>34   | 1232         | 1200         | 1168         |              | 1105         |              | 1044         |              |               |              |              | 0893<br>0892 | 0863<br>0863 | 0834<br>0833 | 0805                         |
| 35         | 1231<br>1231 | 1199<br>1199 | 1168         |              | 1105         |              | 1043<br>1043 |              |               | 0952<br>0952 | 0922<br>0922 | 0892         | 0862         | 0833         | 08 <b>04</b><br>08 <b>04</b> |
| 36         | 1230         | 1198         | 1167         |              | 1104         |              | 1042         |              | 0981          | 0951         | 0921         | 0891         | 0862         | 0833         | 0803                         |
| 37         | 1230         | 1198         |              | 1135         |              | 1072         | 1042         |              | 0981          | 0951         | 0921         | 0891         | 0861         | 0832         | 0803                         |
| 38         | 1229         | 1197         | 1165         | 1134         |              |              | 1041         | -            |               |              | 0920         | 0890         | 0861         | 0832         | 0802                         |
| 39         | 1229         | 1197         | 1165         | 1134         | 1102         | 1071         | 1041         | 1010         | 0980          | 0950         | 0920         | 0890         | 0860         | 0831         | 0802                         |
| 40         | 1228         | 1196         | 1164         | 1133         | 1102         |              | 1040         |              | 0979          |              | 0919         | 0889         | 0860         | 0831         | 0801                         |
| 41<br>42   | 1227<br>1227 | 1196         |              | 1132         |              |              | 1039         |              | 0979          | 0949         | 0919         | 0889<br>0888 | 0859         | 0830         |                              |
| 43         | 1227         | 1195<br>1194 | 1163         | 1132         | 1101         |              | 1039         |              | 0978<br>-0978 | 0948<br>0948 | 0918<br>0918 | 0888         | 0859<br>0858 | 0830<br>0829 |                              |
| 44         | 1226         | 1194         |              | 1131         | 1100         |              | 1038         |              |               | 0947         | 0917         | 0887         | 0858         | 0829         |                              |
| 45         | 1225         | 1193         | 1162         | 1130         | 1099         | 1068         | 1037         | 1007         | 0977          | 0947         | 0917         | 0887         | 0857         | 0828         |                              |
| 46         | 1225         | 1193         | 1161         | 1130         | 1099         |              |              |              | 0976          | 0946         | 0916         | 0886         | 0857         | 0828         | ,                            |
| 47<br>48   | 1224<br>1224 | 1192<br>1192 | 1161         | 1129<br>1129 | 1098<br>1098 | 1067         | 1036<br>1036 | 1006<br>1005 | 0976<br>0975  | 0946<br>0945 | 0916<br>0915 | 0886<br>0885 | 0856<br>0856 | 0827<br>0827 | 0798                         |
| 49         | 1223         | 1191         | 1160         |              | 1097         | 1066         | 1035         |              | 0975          | 0945         | 0915         | 0885         | 0855         | 0826         | 0798<br>0797                 |
| 50         |              |              | 1159         |              |              |              | !            |              |               |              |              |              |              |              |                              |
| 51         | 1223         | 1190         | 1159         | 1127         | 1096         | 1065         | 1035         | 1004         | 0974          | 0944         | 0914         | 0884         |              |              | 0797                         |
| 52         |              |              | 1158         |              |              |              |              |              |               |              |              |              |              |              | 1                            |
| 53         | 1221         | 1189         | 1158         | 1126         | 1095         | 1064         | 1033         | 1003         | 0973          | 0943         | 0913         | 0883         | 0854         | 0824         | 0795                         |
| 5 <u>4</u> | 1221         | 1189         | 1157         | 1126         | 1095         | 1064         | 1033         | 1002         | 0972          | 0942         |              |              | 0853         | 0824         |                              |
| 55<br>56   |              | 1188         | 1157         | 1125         |              |              | 1032         |              | 0972<br>0971  | 0942<br>0941 | 0912         | 0882<br>0882 | 0853<br>0852 | 0823<br>0823 | 1                            |
| 57         |              | 1187         |              | 1124         |              |              |              | 1001         | 0971          | 0941         |              |              | 0852         | 0822         |                              |
| 58         | 1218         | 1187         | 1155         | 1124         | 1092         | 1062         | 1031         | 1000         | 0970          | 0940         | 0910         | 0881         | 0851         | 0822         | 1                            |
| 59         | 1218         | 1186         | 1154         | 1123         | 1092         | 1061         | 1030         | 1000         | 0970          | 0940         | 0910         | 0880         | 0851         | 0821         | 0792                         |
|            | 15'          | 16'          | 17'          | 18/          | 19'          | 50,          | 21'          | 22'          | 23/           | 24           | 25'          | 26'          | 27/          | 28′          | 29'                          |

| ]  | <u> </u>     |              |              |              | <del></del> -        | 2 Dro        |              | OR 2                      | Hom          |              |              |              |                      |              |                              |
|--|--------------|--------------|--------------|--------------|----------------------|--------------|--------------|---------------------------|--------------|--------------|--------------|--------------|----------------------|--------------|------------------------------|
| Sec.   | 30'          | 31'          | 32"          | 39'          | 34                   | 35'          | 36'          | 37'                       | 38/          | 39           | 40'          | 41/          | 42                   | 43/          | 44                           |
|  |              |              |              |              |                      |              |              |                           |              |              |              |              |                      |              |                              |
| 0  | 0792<br>0791 | 0763         | 0734         | 0706         | 0678                 | 0649         | 0621         | 0594                      | 0566         |              | 0.512        | 0484         | 0458                 | 0431         | 0404                         |
| 2  | 0791         | 0762<br>0762 | 0734<br>0733 | 0705         | 0677<br>77ز ت        | 0649         | 0621         | 0593                      | 0566         | 0538         | 0511         | 0484         | 0457                 | 0430         |                              |
| 3  | 0790         | 0752         | 0733         | 0703         | 0676                 | 0648         | 0621<br>0620 | 0593<br>05 <del>9</del> 2 | 0565<br>0565 | 0538<br>0537 | 0511<br>0510 | 0484<br>0483 | 0457                 | 0430<br>0430 |                              |
| 4  | 0790         | 0761         | 0732         | 0704         | 0676                 | 0648         | 0620         | 0592                      | 0564         | 0537         | 0510         | 0483         | 0456<br><b>0</b> 456 | 0429         | 0402                         |
| 5  | 0789         | 0761         | 0732         | 0703         | 0675                 | 0647         | 0619         | 0591                      | 0564         | 0536         | 0509         | 0482         | 0455                 | 0429         | 0402                         |
| 6  | 0789         | 0760         |              | 0703         | 0675                 | 0647         | 0619         | 0591                      | 0563         | 0536         | 0509         | 0482         | 0455                 | 0428         | 0402                         |
| 7  | 0788         | 0760         | 0731         | 0702         | 0674                 | 0646         | 0618         | 0590                      | 0563         | 0536         | 0508         | 0481         | 0454                 | 0428         | 0401                         |
| 8  | 0788         | 0759         | 0750         | 0702         | 0674                 | 0646         | 0618         | 0590                      | 0562         | 0535         | 0508         | 0481         | 0454                 | 0427         | 0401                         |
| 9  | 0787         | 0759         | 0730         | 0702         | 0673                 | 0645         | 0617         | 0590                      | 0562         | 0535         | 0507         | 0480         | 0454                 | 0427         | 04C0                         |
| 10   | 0787         | 0758         | 0729         | 0701         | 0673                 | 0645         | 0617         | 0589                      | 0562         | 0534         | 0507         | 0480         | 0453                 | 0.126        | 0400                         |
| 11   | 0787         | 0758         | 0729         | 0701         | 0672                 | 0644         | 0616         |                           | 0561         | 0534         | 0507         | 0479         | 0453                 | 0426         | 0399                         |
| 12   | 0786         | 0757         | 0729         | 0700         | 0672                 | 0644         | 0616         | 0588                      | 0561         | 0533         | 0506         | 0479         | 0452                 | 0426         |                              |
| 13   | 0786         | 0757         | 0728         | 0700         | 0671                 | 0643         | 0615         | 0588                      | 0560         | 0533         | 0506         | 0479         | 0452                 | 0425         | 0399                         |
| 14   | 0785         | <b>07</b> 56 | 0728         | 0699         | 0671                 | 0643         | 0615         | 0587                      | 0560         |              | 050,5        | 0478         | 0451                 | 0425         | 0398                         |
| 15<br>16                                     | 0785         | 0756         | 0727         | 0699         | 0670                 | 0642         | 0615         | 0587                      |              |              | 0505         | 0478         | 0451                 | 0424         | 0398                         |
| 17   | 0784<br>0784 | 0755         | 0727         | 0698         | 0670                 | 0642         | 0614         |                           | 0559         |              | 0504         | 0477         | 0450                 | 0424         | 0397                         |
| 18   | 0783         | 0755<br>0754 | 0726<br>0726 | 0698         | 0669                 | 0641         | 0614         |                           | 0558         | 0531         |              | 0477         | 0450                 | 0423         | 0397                         |
| 19   | 0783         | 0754         | 0725         | 0697<br>0697 | 0669<br>0669         | 0641         | 0613         | 0585                      |              | 0531         | 0508         | 0476         | 0450                 | 0423<br>0422 | 0396<br>0396                 |
|  |              |              |              |              |                      | 0641         | 0613         | 0585                      | 0557         | 0530         | 0508         | 0476         | 0449                 | U132         |                              |
| 20   | 0782         | 0753         | 0725         | 0696         | 0668                 | 0640         | 0612         | 0584                      | 0557         | 0530         | 0502         | 0475         | 0449                 | 0422         | 0395                         |
| 21<br>22                                     | 0782         | 0753         | 0724         | 0696         | 0668                 | 0640         | 0612         | 0584                      |              | 0529         | 0502         | 0475         | 0448                 | 0422         | 0395                         |
| 23   | 0781<br>0781 | 0752         | 0724         | 0695         | 0667                 | 0639         | 0611         | 0584                      |              | 0529         | 0502         | 0475         | 0448                 | 0421         | 0395                         |
| 24   | 0780         | 0752<br>0751 | 0723<br>0723 | 0695         | 0667                 | 0639         | 0611         |                           | 0556         | 0528         | 0501         | 0474         | 0447                 | 0421         | 0394                         |
| 25   | 0780         | 0751         | 0723         | 0694<br>0694 | 0666<br>066 <b>6</b> | 0638<br>0638 | 0610<br>0610 |                           | 0555<br>0555 | 0528<br>0527 | 0501         | 0474         | 0447<br>0446         | 0420<br>0420 | 0394<br>0393                 |
| 26.  | 0779         | 0750         | 0722         | 0693         | 0665                 | 0637         | 0609         | 0582                      |              | 0527         | 0500         | 0473<br>0473 | 0446                 | 0419         | 0393                         |
| 27   | 0779         | 0750         | 0721         | 0698         | 0665                 | 0637         | 0609         | 0581                      | 0554         | 0526         | 0499         | 0472         | 0446                 | 0419         | 0392                         |
| 28   | 0778         | 0750         | 0721         | 0693         | 0664                 | 0636         | 0608         | 0581                      |              | 0526         | 0499         | 0472         | 0445                 | 0418         | 0392                         |
| 29   | 0778         | 0749         | 0720         | 0692         | 0664                 | 0636         | 0608         |                           | 0553         | 0526         | 0498         | 0471         | 0445                 | 0418         | 0391                         |
| 30   | 0777         | 0749         | 0720         | 0692         | 0663                 | 0635         | 0608         | 0.580                     | 0552         | 0525         | 0498         | 0471         | 0444                 | 0418         | 0391                         |
| 31   | 0777         | 0748         | 0720         | 0691         | 0663                 | 0635         | 0607         | 0579                      | 0552         | 0525         | 0497         | 0471<br>0471 | 0444                 | 0417         | 0391                         |
| 32   | 0776         | 0748         | 0719         | 0691         | 0662                 | 0634         | 0607         |                           | 0551         | 0524         | 0497         | 0470         | 0443                 | 0417         | 0390                         |
| 33   | 0776         | 0747         | 0719         | 0690         | 0662                 | 0654         | 0606         | 0579                      |              | 0524         | 0497         | 0470         | 0443                 | 0416         | 0390                         |
| 34   | 0775         | 0747         | 0718         | 0690         | 0662                 | 0684         | 0606         | 0578                      | 0551         | 0523         | 0496         | 0469         | 0442                 | 0416         | 0389                         |
| 35   | 0775         | 0746         | 0718         | 0689         | 0661                 | 0633         | 0605         | 0578                      | 0550         | 0523         | 0496         | 0469         | 0442                 | 0415         | 0389                         |
| 36<br>37                                     | 0774         | 0746         | 0717         | 0689         | 0661                 | 0633         | 0605         | 0577                      | 0550         | 0522         | 0495         | 0468         | 0442                 | 0415         | 0388                         |
| 38   | 0774<br>0773 | 0745<br>0745 | 0717<br>0716 | 0688         | 0660                 | 0632         | 0604         | 0577                      | 0549         | 0522         | 0495         | 0468         | 0441                 | 0414         | 0388                         |
| 89   | 0773         | 0744         | 0716         | 0688<br>0687 | 0660                 | 0632<br>0631 | 0604<br>0603 | 0576<br>0576              | 0549         | 0521<br>0521 | 0494<br>0494 | 0467         | 0441                 | 0414<br>0414 | 0388<br>0387                 |
|  |              |              |              |              | 0033                 |              |              | 0316                      | 0548         | 0521         | 0494         | 0467         | 0440                 | 0717         | 0301                         |
| 40   | 0773         | 0744         |              | 0687         | 0659                 | 0631         | 0603         | 0575                      | 0548         | 0521         | 0493         | 0466         | 0440                 | 0413         | 0587                         |
| 41<br>42                                     | 0772         | 0743         | 0715         | 0686         | 0658                 | 0630         | 0602         | 0575                      | 0547         | 0520         | 0493         | 0466         | 0439                 | 0413         | 0386                         |
| 43   | 0772<br>0771 | 0743<br>0742 | 0714<br>0714 | 0686<br>0685 | 0658                 | 0630         | 0602         | 0574                      | 0547         | 0520         | 0493         | 0466         | 0439                 | 0412         | 0386                         |
| 44   | 0771         | 0742         |              | 0685         | 0657<br>0657         | 0629<br>0629 | 0602<br>0601 | 0574                      |              | 0519<br>0519 | 0492         | 0465         | 0438<br>0438         | 0412         | 038 <i>5</i><br>038 <i>5</i> |
| 45   | 0770         | 0741         | 0713         | 0685         | 0656                 | 0628         | 0601         | 0573<br>0573              | 0546<br>0546 | 0518         | 0492<br>0491 | 0465<br>0464 | 0438                 | 0411<br>0411 | 0384                         |
| 46   | 0770         | 0741         | 0712         | 0684         |                      | 0628         | 0600         |                           | 0545         | 0518         | 0491         | 0464         | 0437                 | 0410         | 0384                         |
| 47   | 0769         | 0740         |              | 0684         | 0655                 | 0627         | 0690         | 0572                      | 0545         | 0517         | 0490         | 0463         | 0437                 | 0410         | 0384                         |
| 48   | 0769         | 0740         | 0711         | 0683         | 0655                 | 0627         | 0599         |                           | 0544         | 0517         | 0490         | 0463         | 0436                 | 0410         | 0383                         |
| 49   | 0768         | 0739         | 0711         | 0683         | 0655                 | 0627         | 0599         |                           | 0544         | 0516         | 0489         | 0462         | 0436                 | 0409         | 0383                         |
| 50   | 0768         | 0739         | 0711         | 0682         | 0654                 | 0626         | <b>0</b> 598 | 0571                      | 0548         | 0516         | 0489         | 0462         | 0495                 | 0409         | 0382                         |
| 51   | 0767         | 0739         | 0710         | 0682         | 0654                 | 0626         | 0598         | 0570                      | 0543         | 051C         | 0489         | 0462         | 0435                 | 0408         | 0982                         |
| 52   | 0767         | 0738         | 0710         | 0681         | 0653                 | 0625         | 0597         | 0570                      | 0542         | 0515         | 0488         | 0461         | 0434                 | 0408         | 0381                         |
| 53   | 0766         | 0738         | 0709         | 0681         | 0653                 | 0625         | 0597         | 0569                      | 0542         | 0515         | 0488         | 0461         | 0434                 | 0407         | 0381                         |
| 54   | 0766         | 0737         | 0709         | 0680         | 0652                 | 0624         | 0596         | 0569                      | 0541         | 0514         | 0487         | 0460         | 0434                 | 0407         | 0381                         |
| 55<br>56                                     |              |              | 0708         |              |                      | 0624         |              | 0568                      |              |              |              |              |                      |              |                              |
| 56<br>57                                     |              |              | 0708<br>0707 |              |                      |              | 0596         | 0568                      | 0541         | 0513         | 0486         | 0459         | 0433                 |              |                              |
| 58   |              | 0735         |              | 0679         |                      | 0623<br>0622 |              | 0568<br>0567              |              | 0513<br>0512 |              |              |                      |              |                              |
| 59   |              |              |              |              | 0650                 |              |              | 0567                      |              | 0512         |              |              |                      |              |                              |
| 52<br>53<br>54<br>55<br>56<br>57<br>58<br>59 | I            | l            | 1            | I            | i .                  | 1            | •            | 1                         |              |              |              |              |                      |              |                              |
| H  | 1 30         | 1 31/        | 327          | 33/          | 34/                  | 9 <i>5</i> / | 36/          | 37'                       | 38/          | 99           | 40'          | 41'          | 49                   | 49/          | 44'                          |

|                                 |                          |              |              |              | 2 DE         | GREES                                  | , OR         | 2 Ho                           | URS.         |              |              |              |              |              |
|---------------------------------|--------------------------|--------------|--------------|--------------|--------------|--|--------------|--------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 4 /                             | 46'                      | 47'          | 48'          | 49/          | 50'          | 51'                                    | 521          | 53'                            | 54           | 55'          | 561          | 57'          | 58/          | 59           |
| 0378                            |                          |              |              |              | 0248         |  | 0197         | 0172                           |              |              |              |              |              |              |
| 0377                            |                          | 0325         |              | 0273         |              |  | 0197         |                                |              |              | 1            |              | 0048         |              |
| 0377                            |                          |              |              |              |              |  | 0197         |                                |              |              |              |              |              | I .          |
| 0376                            | 03.50                    | 0324         | 0298         | 0272         | 0246         | 0221                                   | 0196         | 0171                           | 0146         | 012i         |              |              |              |              |
| 0376                            |                          | 1            |              |              |              |  |              |                                |              |              |              |              | 0046         |              |
| 037 <i>5</i><br>037 <i>5</i>    |                          | 1            |              |              |              |  |              | 1                              |              |              |              |              |              | 0021         |
| 0374                            | 0348                     | 0322         | 0296         | 0270         | 0245         | 0219                                   | 0194         | 0169                           | 0144         | 0119         | 0094         | 0070         | 0045         | 0021         |
| 0374                            | 0348                     | 0322         | 0296         | 0270         | 0244         | 0219                                   | 0194         | 0169                           | 0145         | 0119         | 0094         | 0069         | 004.5        |              |
| 0379                            |                          | 1            | 0295         | 1            |              |  | 1            | 0168                           | 1            |              | 0093         |              | 0044         |              |
| 0373<br>0373                    |                          |              |              |              |              |  |              | 0168                           |              |              |              |              |              |              |
| 0372                            |                          |              |              |              |              |  | 1            |                                |              |              |              |              |              | 1            |
| 0372                            |                          |              |              | 1            |              | 0217                                   | 0192         |                                |              |              |              |              |              | 0018         |
| → 0371<br>→ 0371                | l                        | 1            |              | 1            |              |  |              | 1                              |              | 1            |              |              | •            | 0018         |
| 0371                            |                          |              |              |              |              | 0216<br>0216                           |              |                                |              | 0115         |              |              | 0042         | 0017         |
| 0370                            |                          |              |              | 0266         | 0241         | 0215                                   | 0190         | 0165                           | 0140         |              |              |              |              | 0017         |
| 0370                            |                          | 0317         | 0291         | 0266         | 0240         | 0215                                   | 0189         | 0164                           | 0139         | 0114         | 0090         | 0065         | ļ            | 0016         |
| 0369                            |                          |              |              | 0265         |              |  | 0189         |                                |              |              | 0089         | 1            |              | 0016         |
| 0369                            | 1                        |              |              | 0265         |              |  | 0189<br>0188 |                                |              | 1            |              |              |              |              |
| 0368                            |                          |              |              |              | 1            |  |              |                                |              |              |              |              |              | 0015         |
| 0367                            | 1                        | _            |              | 0264         | 1            |  | 0187         |                                |              |              |              | 1            |              |              |
| 0367<br>0366                    | 0341                     | -            |              | 0263         |              |  | 0187<br>0186 |                                |              |              |              |              |              | 0014<br>0014 |
| 0366                            | 1                        | 1            |              | 0262         |              |  | 0186         |                                |              |              |              |              |              | <b>!</b>     |
| 0366                            |                          |              |              | 0262         |              | 0211                                   | 0186         |                                |              |              |              |              | 1            | 0013         |
| 0365                            | 0339                     | 0315         | 0287         | 0261         | 0236         | 0210                                   | 0185         | 0160                           | 0135         | <b> </b>     |              |              | 0037         | 0012         |
| 0365                            | 0339                     |              | 0287         | 0261         | 0235         | 0210                                   | 0185         | 0160                           |              |              | 0085         |              | 0036         |              |
| 0864<br>0364                    | 0338<br>0338             | 0312         | 0286<br>0286 | 0261<br>0260 | 0235<br>0235 | 0210<br>0209                           | 0184<br>0184 | 01 <i>5</i> 9<br>01 <i>5</i> 9 |              |              |              |              |              | 0012         |
| 0363                            |                          | 0311         | 0285         | 0260         |              | 0209                                   | 0184         |                                |              | 1            |              |              |              | 0011         |
| 0363                            | 0337                     |              | 0285         | 0259         | 0234         | 0208                                   | 0183         |                                |              |              |              |              |              | 0010         |
| 0363<br>0362                    |                          |              | 0285<br>0284 | 0259<br>0258 | 0233<br>0233 | 0208<br>0208                           | 0183<br>0182 |                                |              |              | 0083<br>0083 |              |              | 0010         |
| 0362                            | 0836                     | 0310         | 0284         | 0258         | 0232         | 0207                                   | 0182         | 0157                           | 0132         | 0107         | 0082         | 0058         | 0033         | 0009         |
| 0361<br>0361                    | 0335<br>0335             | 0309         | 0283<br>0283 | 0258         | 0232         | 0207                                   | 0181         | 0156                           |              | 0107<br>0106 | 0082<br>0082 |              | 0033         | 0009<br>0008 |
|                                 | <u> </u>                 |              |              | 0257         | 0232         | 0206                                   | 0181         | 0156                           |              |              |              | 0057         | 0033         |              |
| 0360<br>0360                    | 033 <del>4</del><br>0334 | 0308<br>0508 | 0282<br>0282 | 0257<br>0256 | 0231         | 0206<br>0205                           | 0181         |                                | 0131<br>0130 | 0106<br>0105 | 0081         | 0057<br>0056 | 0032<br>0032 | 8000<br>8000 |
| 0359                            | 0333                     |              | 0282         | 0256         | 0230         | 0205                                   | 0180         |                                | 0130         | 0105         | 0080         |              | 0032         | 0007         |
| 0359                            | 0333                     | 0307         | 0281         | 0255         | 0230         | 0205                                   | 0179         | 0154                           |              | 0105         | 0080         | 0055         | 0031         | 0007         |
| 0359                            | 0332<br>0332             | 0306<br>0306 | 0281<br>0280 | 0255         | 0230         | 0204                                   | 0179<br>0179 | 0154                           | 0129<br>0129 | 0104<br>0104 | 0080         |              | 0031<br>0030 | 0006<br>0006 |
| 0358                            |                          | 0306         | 0280         | 0254         |              | 0203                                   |              |                                | 0128         | 0103         | 0079         | 0054         | 0030         | 0006         |
| 0357                            | 0331                     | 0305         | 0279         | 0254         |              | 0203                                   |              |                                | 0128         | 0108         | 0078         | 0054         | 0029         | 0005         |
| 03 <i>5</i> 7.<br>03 <i>5</i> 6 | 0331<br>0330             | 0305         | 0279<br>0279 | 0253         | ,            | 0202                                   | 0177         | 0152                           | 0127<br>0127 | 0103<br>0102 | 0078         | 0053<br>0053 | 0029<br>0029 | 0005         |
|                                 |                          |              |              |              | i            | !                                      |              | !                              |              |              |              |              | ;            | 0004         |
| 0356                            | 0329                     | 0304         | 0278         | 0252         | 0227         | 0201                                   | 0176         | 0151                           | 0126         | 0102         | 0077         | 0053<br>0052 | 0028<br>0028 | 0004         |
| 035 <b>5</b>                    | 0329                     | 0303         | 0277         | 0252         | 0226         | 0201                                   | 0176         | 0151                           | 0126         | 0101<br>0101 | 0076         | 0052         |              | 0003         |
| 0355                            | 0329                     | 0333         | 0277         | 0251         | 0226         | 0200                                   | 0175         | 0150                           | 0125         | 0100         | 0076         | 0051         | 0027         | 0003         |
|                                 |                          |              |              |              |              |  |              |                                |              | 0100         |              |              | 0027         | 0002         |
| 0353                            | 0327                     | 0301         | 0276         | 0250         | 0224         | 0199                                   | 0174         | 0149                           | 0124         | 0099         | 0075         | 0050         | 0026         | 0002         |
| 0353<br>0352                    |                          | 0301         |              | 0250         | 0224         | 0199 <sup>†</sup><br>0198 <sup>‡</sup> | 0174         | 0148                           | 0124         | 0099         |              |              | 0025         | 0001<br>0001 |
| 0352                            |                          |              | - 1          | 0249         | 0223         | 0198                                   | 0173         | 0148                           | 0123         | 0.98         |              |              |              | 0000         |
| 45                              | 46'                      | 47/          | 48/          |              |              | 51'                                    |              |                                | l-           | 55'          | i-           | 57'          | 58'          | 59           |
|                                 |                          |              |              | <u> </u>     | <u></u>      |  | (            |                                |              |              |              |              |              |              |

TABLE XLII.

|            |                    | BEIW       | EEN        | Arm        | ument.     |            |            | ENT       |          |          |          |                |          |          |            |          |
|------------|--------------------|------------|------------|------------|------------|------------|------------|-----------|----------|----------|----------|----------------|----------|----------|------------|----------|
| Arg.       | Add                | the D      | fference   | e of       | the tw     | o Nu       | nbers      | take      | n ou     | t of     | this '   | Table          | , if     | the A    | Appar      | rent     |
| Par.in     |                    |            | Dista      | ance is    | less t     | han 9      | 0°, a      | nd Su     | btrac    | t it i   | f abo    | ove.           |          |          |            |          |
| Dist.      | 100                | 11°        | 12°        | 130        | 140        | 150        | 16°        | 170       | 18°      | 190      | 200      | 210            |          | 230      |            | 25°      |
| Min.       | "                  | "          | "          | il.        | "          | "          | "          | "         | "        |          | "        | " -            | "        | "        | #          | 11       |
| 5          | 1                  | 1          | 1          | 1          | 1          | 1 2        | 1 2        | 1 2       | 1 2      | 1 2      | 1 2      | 1              | 1        | 1        | 0          | 0        |
| 8<br>10    | 3<br>5             | . 3<br>4   | 3<br>4     | 2 4        | 3          | 3          | 3          | . 3       | 3        | 3        | 2        | 2              | 2        | 2        | 2          | 1 2      |
| 11         | 6                  | 5          | 5          | 5          | 4          | 4          | 4          | 3.        | 3        | 3        | 3        | 3              | 3        | 2        | 2          | 2        |
| 12<br>13   | 7 8                | 6<br>8     | 6          | · 5        | 5          | 5<br>6     | 5          | 5         | 5        | 4        | 3 4      | 8 4            | 3 4      | 8        | 3          | 3        |
| 14         | 10                 | 9          | 8          | 7          | 7          | 6          | 6          | 6         | 5        | 5        | 5        | 4              | 4        | 4        | 4          | 4        |
| 15<br>16   | 11<br>13           | 10         | 9          | 9<br>10    | 8 9        | 7 8        | 8          | 6         | 6        | 6        | 5<br>6   | 5              | 5        | 5        | 5          | 4<br>5   |
| 17         | 14                 | 13         | 12         | 11         | 10         | 9          | 9          | 8         | 8        | 7        | 7        | 7              | -6       | 6        | 6          | 5        |
| 18<br>19   | 16<br>18           | 15<br>16   | 13<br>15   | 12<br>14   | 11<br>13   | 11 12      | 10         | 10        | 10       | 8 9      | 8        | 8              | 8        | 7        | 6          | 6 7      |
| 20         | 20                 | 18         | 16         | 15         | 14         | 13         | 12         | 11        | 11       | 10       | 10       | 9              | 9        | 8        | 8          | 7        |
| 21         | 22                 | 20         | 18         | 17         | 15         | 14         | 13         | 13        | 12<br>13 | 11       | 11       | 10             | 10       | .9       | 9          | 8        |
| 22<br>23   | 24<br>26           | 22<br>24   | 20<br>22   | 18<br>20   | 17<br>19   | 16<br>17   | 15         | 15        | 14       | 13       | 12<br>13 | 11             | 10       | 10       | 10         | 10       |
| 24         | 28                 | 26         | 24         | 22         | 20         | 19         | 18         | 16        | 15<br>17 | 15<br>16 | 14       | 13             | 12       | 12       | 11         | 11       |
| 25<br>26   | 31                 | 28<br>30   | 26<br>28   | 24<br>26   | 22<br>24   | 20         | 19 21      | 19        | 18       | 17       | 15       | 14             | 15       | 13       | 12         | 12       |
| 27<br>28   | 36<br>39           | 33<br>35   | 30         | 28         | 26<br>27   | 24<br>26   | 22<br>24   | 21 22     | 20<br>21 | 18<br>20 | 17       | 17             | 16<br>17 | 15       | 14         | 13       |
| 29         | 42                 | 33         | 32<br>35   | 30<br>32   | 29         | 27         | 26         | 24        | 23       | 21       | 20       | 19             | 18       | 17       | 16         | 16       |
| 30         | 45                 | 40         | 37         | 34         | 31         | 29         | 27         | 26        | 24       | 23       | 22       | 20             | 19       | 19       | 18         | 17       |
| 31<br>32   | 48<br>51           | 43<br>46   | 39<br>42   | 36<br>39   | 34         | 31<br>33   | 29<br>31   | 27        | 26<br>27 | 24<br>26 | 23<br>25 | 22<br>23       | 21<br>22 | 20       | 19<br>20   | 18       |
| 33         | 54                 | 49         | 45         | 41         | 38         | 35         | 33         | 31        | 29       | 28       | 26       | 25             | 24       | 22       | 21         | 20       |
| 34<br>35   | 57<br>61           | 52<br>55   | 47<br>50   | 44         | 40         | 38<br>40   | 35<br>  37 | 33        | 31<br>33 | 29<br>31 | 28<br>29 | 26<br>28       | 25<br>26 | 24 25    | 23<br>24   | 22<br>23 |
| 36         | 64                 | <i>5</i> 8 | 53         | 49         | 45         | 42         | 39         | 37        | 35       | 33       | 31       | 29             | 28       | 27       | 25         | 24       |
| 37<br>38   | 68                 | 61<br>65   | 56<br>59   | 52<br>55   | 48<br>51   | 45<br>47   | 42<br>44   | 39<br>41  | 37<br>39 | 35       | 33       | 31             | 30       | 28       | 27<br>28   | 26<br>27 |
| 39         | 75                 | 68         | 62         | 57         | 58         | 50         | 46         | 43        | 41       | 39       | 36       | 35             | 33       | 31       | 30         | 28       |
| 40         | 79                 | 72         | 66         | 60         | 56         | 52         | 49         | 46        | 43       | 41       | 38       | 36             | 35       | 33       | 31         | 30       |
| 41         | 83                 | 75<br>79   | 69<br>72   | 63<br>67   | 59<br>62   | 55<br>57   | 51<br>54   | 48<br>50  | 45       | 43<br>45 | 40<br>42 | 38             | 36<br>38 | 35<br>36 | 88<br>85   | 31<br>33 |
| 43         | 91                 | 83         | 76         | 70         | 65         | 60<br>63   | 56<br>59   | 53<br>55  | 50<br>52 | 47<br>49 | 44       | 42<br>44       | 40<br>42 | 38       | 36         | 35       |
| 44         | 96<br>100          | 87<br>91   | 79<br>83   | 73         | 68         | 66         | 62         | 58        | 54       | 51       | 46<br>49 | 46             | 44       | 40       | 58<br>40   | 36<br>38 |
| 46<br>47   | 105<br>109         | 95<br>99   | 87<br>91   | 80<br>83   | 74<br>77   | 69<br>72   | 64         | 60<br>63  | 57<br>59 | 54<br>56 | 51<br>53 | 48<br>50       | 46<br>48 | 48       | 41         | 40       |
| 48         | 114                | 103        | 94         | 87         | 81         | 75         | 70         | 66        | 62       | 58       | 55       | 52             | 50       | 47       | 45         | 43       |
| 49<br>50   | 119<br>124         | 108<br>112 | 98<br>103  | 91<br>94   | 84<br>87   | 78<br>81   | 73<br>76   | 68        | 64       | 61<br>63 | 58<br>60 | 55<br>57       | 52<br>54 | 49<br>51 | 47         | 45       |
| 51         | 128                | 117        | 107        | 98         | 91         | 85         | 79         | 74        | 70       | 66       | 62       | <del>3</del> 9 | 56       | 53       | 51         | 49       |
| 52         | 134                | 121        | 111        | 102        | 95         | 88         | 82         | 77        | 73       | 68       | 65       | 61             | 58       | 56       | 53         | 51       |
| 53<br>54   | 139<br>144         | 126<br>131 | 115<br>120 | 106<br>110 | 98<br>102  | 91<br>95   | 85<br>89   | 80<br>83  | 75<br>78 | 71<br>74 | 67<br>70 | 64<br>66       | 61<br>63 | 58<br>60 | 55<br>57   | 53<br>55 |
| 55         | 149.               | 136        | 124        | 114        | 106        | 98         | 92         | 86        | 81       | 77,      | 72       | 69             | 65       | 62       | 59         | 57       |
| 56<br>57   | 1 <i>55</i><br>160 | 141<br>146 | 129<br>133 | 118<br>123 | 110<br>114 | 102        | 95<br>99   | 89<br>93  | 84<br>87 | 79<br>82 | 75<br>78 | 71<br>74       | 68<br>70 | 64<br>67 | .61<br>64  | 59<br>61 |
| <i>5</i> 8 | 166                | 151        | 138        | 127        | 118        | 109        | 102        | 96        | 90       | 85       | 81       | 76             | 73       | 69       | <b>6</b> 6 | 63       |
| 59<br>60   | 172<br>178         | 156<br>161 | 143<br>148 | 131<br>136 | 122<br>126 | 113<br>117 | 106<br>109 | 99<br>103 | 93<br>97 | 88<br>91 | 83<br>86 | 79<br>82       | 75<br>78 | 72<br>74 | 68<br>71   | 65<br>67 |
| 61         | 184                | 167        | 152        | 140        | 130        | 121        | 113        | 106       | 100      | 94       | 89       | 85             | 80       | 76       | 73         | 70       |
| 62         | 190                | 172        | 158        | 145        | 134        |            |            | 110       | 108      | 97       | 92       | 87             | 83       | 79       | 75         | 72       |
|            |                    |            |            |            |            |            |            | . '       |          |          |          |                |          |          |            |          |

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TABLE XLII.

| Arg.                     |          |          |          | Argum    | ent      | APPA     | RENT     |          | ANCE     |          |          |           |          |
|--------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|
| Parallax<br>in Alti      | Add      | the Di   | _        |          |          | Numb     |          |          |          |          | le, if   | he An     | narent   |
| tude or                  |          |          | Distan   | ce is l  | ess the  | an 90°,  | and S    | ubtrac   | t it if  | above.   |          |           |          |
| listance                 | 26°      | 270      | 280      | 29°      | 30'      | 310      | 32°      | 33°      | 340      | 35°      | 36°      | 37°       | 380      |
| Min.                     |          |          | "        | . "      | "        | _"       | "        |          |          |          | "        | "         |          |
| · 5<br>8                 | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0         | 0        |
| 10                       | 2        | 2        | 2        | 2        | 2        | i        | 1        | î        | î        | i        | i        | i         | i        |
| 11                       | . 2      | 2        | 2        | 2        | 2        | 2        | 2        | 2        | 2        | 2        | 1        | 1         | 1        |
| . 12<br>13               | 3<br>3   | 2        | 2<br>3   | 2 3      | 2 3      | 2 2      | 2 2      | 2<br>2   | 2 2      | 2        | 2        | 2 2       | 2        |
| 14                       | 4        | 3        | 3        | 8        | ` 8      | 3        | 3        | 3        | 3        | 2        | 2        | 2         | 2        |
| 15<br>16                 | 4<br>5   | 4        | 4        | 4        | 3 4      | 3<br>4   | 3 4      | 3<br>3   | 3        | 8 3      | <b>3</b> | 3         | S<br>5   |
| 17                       | 5        | 5        | - 5      | 5        | 4        | 4        | 4        | 4        | 4        | 4        | 3        | 3         | 3        |
| 18<br>19                 | 6        | 6<br>6   | 5<br>6   | 5<br>6   | 5<br>5   | 5<br>5   | 5<br>5   | 4<br>5   | 4<br>5   | 4        | 4        | 4         | 4        |
| 20                       | 7        | 7        | 7        | 6        | 6        | 6        | 6        | 5        | 5        | 5        | 5        | 5         |          |
| 21<br>22                 | 8<br>9   | 8        | 8        | 7 8      | 7        | 6<br>7   | 6 7      | 6        | 6        | 5<br>6   | 5<br>6   | 5<br>6    | 5<br>5   |
| 23                       | 9        | 9        | 9        | 8        | 8        | 8        | 7        | - 7      | 7        | 7        | 6        | 6         | 6.       |
| 24<br>25                 | 10<br>11 | 10<br>11 | 9        | 9<br>10  | 9        | 8<br>9   | 8 9      | 8<br>8   | 8        | 7<br>8   | 7 8      | 7         | 6<br>7   |
| 26                       | 12       | 12       | 11       | 11       | 10       | 10,      | 9        | 9        | . 9      | 8        | 8        | 8         | 8        |
| 27<br>28                 | 13<br>14 | 12<br>13 | 12<br>13 | 11<br>12 | 11<br>12 | 11<br>11 | 10<br>11 | 10<br>11 | 9<br>10  | 9<br>10  | 9<br>9·  | 8<br>9    | 8<br>9   |
| 29                       | 15       | 14       | 14       | 13       | 18       | 12       | 12       | 11       | 11       | 10       | 10       | · 10      | 9        |
| 30                       | 16       | 15       | 15       | 14       | 14       | 13       | 13       | 12       | 12       | 11       | 11       | 10        | 10       |
| 31<br>32                 | 17<br>18 | 16<br>18 | 16<br>17 | 15<br>16 | 15<br>15 | 14<br>15 | 13<br>14 | 13<br>14 | 12<br>13 | 12<br>13 | 12<br>12 | 11<br>12  | 11<br>11 |
| <b>33</b>                | 19       | 19<br>20 | 18       | 17       | 16       | 16       | 15       | 15       | 14       | 14<br>14 | 13<br>14 | 13        | 12<br>13 |
| <b>34</b><br>35          | 21       | 21       | 19<br>20 | 18<br>19 | 17       | 17<br>18 | 16<br>17 | 16<br>16 | 15<br>16 | 15       | 15       | 13<br>.14 | 14       |
| 36<br>37                 | 23<br>24 | 22<br>23 | 21<br>22 | 20       | 20<br>21 | 19<br>20 | 18<br>19 | 17<br>18 | 17       | 16<br>17 | 16<br>16 | 15<br>16  | 14<br>15 |
| 38                       | 26       | 25       | 24       | 22<br>23 | 22       | 21       | 20       | 19       | 18       | 18       | 17       | 17        | 16       |
| <b>39</b><br>40          | 27<br>29 | 26<br>27 | 25<br>26 | 24<br>25 | 23<br>24 | 22<br>23 | 21<br>22 | 20<br>21 | 20<br>21 | 19<br>20 | 18<br>19 | 18<br>19  | 17<br>18 |
| $-\frac{10}{41}$         | 30       | 29       | 28       | 26       | 25       | 24       | 23       | 23       | 22       | 21       | 20       | 19        | 19       |
| 42                       | 32       | 80       | 29       | 28       | 97       | 26       | 25       | 24       | 23       | 22       | 21       | 20        | 20       |
| 43<br>44                 | 33<br>35 | 32       | 30<br>32 | 30       | 28       | 27<br>28 | 26<br>27 | 25<br>26 | 24<br>25 | 25<br>24 | 22       | 21<br>22  | 21<br>22 |
| <b>45</b> ·              | 36       | 3.5      | 33       | 32       | 31       | 29       | 28       | 27       | 26       | 25       | 24       | 23        | 23<br>24 |
| 46<br>47                 | 98<br>40 | 36       | 35<br>36 | 33<br>35 | 32       | 31       | 30<br>31 | 28<br>30 | 27       | 26<br>28 | 25<br>27 | 25<br>26  | 25       |
| 48                       | 41       | 39       | 38       | 36       | 35       | 33<br>35 | 32       | 31<br>32 | 30       | 29<br>30 | 28<br>29 | 27<br>28  | 26<br>27 |
| 49<br><i>5</i> 0         | 43       | 41<br>43 | 39<br>41 | 38       | 36<br>38 | 36       | S4<br>35 | 32<br>34 | 31       | 31       | 30       | 29        | 28       |
| 51                       | 47       | 45       | 43       | 41       | 39       | 38       | 36       | 35       | 34       | 32       | 31       | 30        | 29       |
| 52<br>53                 | 48<br>50 | 46       | 44       | 43       | 41       | 39       | 38       | 36<br>38 | 35<br>36 | 34       | 32<br>34 | 31<br>33  | 90<br>91 |
| 54                       | 52       | 50       | 48       | 46       | 44       | 42       | 41       | 39       | 38       | 36       | 35       | 34        | 55       |
| <i>5</i> 5<br><i>5</i> 6 | 54<br>56 | 52<br>54 | 50<br>51 | 48       | 46       | 44       | 42       | 41       | 39       | 38       | 36       | 35<br>36  | 34<br>35 |
| 57                       | 58       | 56       | 53       | 51       | 49       | 47       | 45       | 44       | 42       | 40       | 39       | 38        | 36       |
| <i>5</i> 8<br>59         | 60       |          | 55<br>57 | 53<br>55 | 51<br>53 | 49<br>51 | 47       | 45<br>47 | 44       | 49       | 40       | 39<br>40  | 38<br>39 |
| 60                       | 64       |          |          | 57       | 54       | 52       | 50       | 48       | 47       | 45       | 43       | 42        | 40       |
| 61                       | 67       |          |          | 59       | 56<br>58 | 54       | 52       | 50       | 48       | 46       | 45<br>46 | 43<br>45. | 49       |
| . 62                     | 69       | 1 00     | 69       | 60       | 1 58     | 56       | 54       | 52       | 50       | 48       | 1 30     | 20.       |          |
| 1                        |          |          |          |          |          |          |          |          |          |          |          |           |          |

### TABLE XLII.

| <del>                                     </del> |            |          |          |          |              | . DD 4 5        | TAIT     | DIOT         | TION     |          |           |          |               |
|--|------------|----------|----------|----------|--------------|-----------------|----------|--------------|----------|----------|-----------|----------|---------------|
| Arg.<br>Parallax                                 |            |          |          | Argum    |              | APPAR           |          |              |          |          |           |          |               |
| in Alti-   | Add        | the Di   | fferenc  | e of t   | e two        | Numb<br>an 90°, | ers tal  | ken ou       | t of th  | is Tab   | ole, if t | he App   | parent        |
| tude or  | 000        | 450      |          |          |              |                 |          |              |          |          |           |          |               |
| distance   | 39°        | 40°      | 410      | 42°      | 490          | 440             | 45°      | 46°          | 470      | 48°      | 49°       | 50°      | 51°           |
| Min.   | "          | ′        |          | "        | "            | "               | -1       |              | "        | "        | "         |          |               |
| 5 8  | 0          | 0        | 0        | 0        | 0            | 0               | 0        | 0            | 0        | 0        | 0         | 0        | 0             |
| 10   | 1          | 1        | 1        | 1        | 1            | 1<br>1          | . 1      | 1            | 1<br>1   | 1        | . 0       | 0        | 0             |
| 11   | 1          | 1        |          | -1       | <del>-</del> | 1               | 1        | <del>-</del> | <u> </u> | -1       |           |          | <u> </u>      |
| 12   | 2          | 1        | i        | 1        | i            | î               | î        | ì            | î        | î        | i         | î        | i             |
| 19 '<br>14                                       | 2          | 2        | 2        | 2        | 2            | 2 2             | 1 2      | 1            | 1<br>2   | 1        | 1         | 1<br>1   | 1             |
| 15   | 2          | 2        | 2 2      | 2        | 2            | ` 2             | 2        | · 2          | 2        | 2 2      | 1 2       | 2        | 1<br>2        |
| 16   | 3          | 3        | 8        | 2        | 2            | 2               | 2        | 2            | 2        | 2        | 2         | 2        | 2             |
| 17<br>18   | 3          | 3<br>3   | <b>S</b> | . S      |              | 8<br>8          | S<br>S   | 2            | 2<br>3   | 2        | . 2       | 2 2      | 2             |
| 19   | 4          | 4        | 4        | 3        | 8            | 3               | 8        | 8            | 8        | 3        | 8         | 3        | 3             |
| 20   | 4          | 4        | 4        | 4        | 4            | 4               | 8        | 3            |          | 3        | 3         |          | 3             |
| 21<br>22   | 5<br>5     | 5<br>5   | 4 5      | 4<br>5   | 5            | 4               | 4        | 4            | 4 4      | 3<br>4   | 3<br>4    | 3<br>4   | 3<br><b>3</b> |
| 23   | 6          | 6        | 5        | 5        | 5            | 5               | 5        | 4            | 4        | 4        | 4         | 4        | 4             |
| 24<br>25   | 6<br>7     | 6        | 6        | 6        | 5            | 5               | 5<br>5   | 5<br>5       | 5<br>5   | 5<br>5   | 4<br>5    | 4 5      | 4             |
| 26   | 7          | 7        | 6 7      | 7        | 6            | 6               | 6        | 6            | 6        | 5        | 5         | 5        | 5             |
| 27<br>28   | 8          | 8        | 7        | 7        | 7            | 7               | 6        | 6            | 6        | . 6      | 6         | 5        | - 5           |
| 28   | 8<br>9     | 8 9      | 8        | 8        | 7 8          | 8               | 7        | 7 7          | 6        | 6        | 6         | 6        | 6<br>6        |
| 30   | 10         | 9        | 9        | 9        | 8            | 8               | 8        | 8            | 7        | 7        | 7         | 7        | 6             |
| 31   | 10         | 10       | 10       | 9        | 9            | 9               | 8        | 8            | 8        | 8        | 7         | 7        | 7             |
| 32<br>33   | 11<br>12   | 11       | 10<br>11 | 10<br>11 | 10           | 10              | 10       | 9            | 8        | 8        | 8         | 8        | 8             |
| 34   | 12         | 12       | 12       | 11       | 11           | 10              | 10       | 10           | 9        | 9        | 9         | 8        | 8             |
| 35<br>36   | 13<br>14   | 13       | 12<br>13 | 12<br>13 | 11           | 11              | 11       | 10<br>11     | 10       | 10       | 9         | 9        | 9             |
| 37   | <b>\15</b> | 14       | 14       | 13       | 13           | 12              | 12       | 12           | 11       | 11       | 10        | 10       | 10            |
| 38<br>39   | 16<br>16   | 15<br>16 | 14       | 14       | 14           | 13<br>14        | 13       | 12<br>13     | 12       | 11       | 11        | 11       | 10            |
| 40   | 17         | 17       | 16       | 16       | 15           | 14              | 14       | 13           | 13       | 13       | 12        | 12       | ii            |
| 41   | 18         | 17       | 17       | 16       | 16           | 15 .            | 15       | 14           | 14       | 13       | 13        | 12       | 12            |
| 42<br>43   | 19<br>20   | 18       | 18       | 17       | 17           | 16<br>17        | 15       | 15<br>16     | 14       | 14       | 13        | 13       | 12            |
| 44   | 21         | 20       | 19       | 19       | 18           | 17              | 17       | 16           | 16       | 15       | 15        | 14       | 14            |
| 45<br>46   | 22<br>23   | 21<br>22 | 20<br>21 | 20       | 19           | 18<br>19        | 18       | 17<br>18     | 16       | 16       | 15<br>16  | 15<br>15 | 14            |
| 47   | 23         | 23       | 22       | 21       | 21           | 20              | 19       | 19           | 18       | 17       | 17        | 16       | 16            |
| 48<br>49   | 25         | 24       | 23       | 22       | 22<br>22     | 21              | 20<br>21 | 19           | 19       | - 18     | 17        | 17       | 16            |
| 50   | 26<br>27   | 25<br>26 | 24<br>25 | 23<br>24 | 23           | 22<br>23        | 21       | 20           | 20       | 19<br>20 | 18<br>19  | 18       | 17            |
| 51   | 28         | 27       | 26       | 25       | 24           | 24              | 23       | 22           | 21       | 20       | 20        | 19       | 18            |
| 52<br>53   | 29         | 28       | 27       | 26       | 25           | 24              | 24       | 23           | 22       | 21       | 21        | 20       | 19            |
| 54<br>54   | 30<br>31   | 29<br>30 | 28       | 27<br>28 | 26<br>27     | 25<br>26        | 25<br>25 | 24<br>25     | 23<br>24 | 22<br>23 | 21<br>22  | 21<br>21 | 20<br>21      |
| 55<br>50   | 33         | 31       | 30       | 29       | 28           | 27              | 26       | 25           | 25       | 24       | 23        | 22       | 21            |
| 56<br>57   | 34<br>35   | 33<br>34 | 31<br>33 | 90<br>31 | 29<br>30     | 28<br>29        | 27<br>28 | 26<br>27     | 26<br>26 | 25<br>26 | 24<br>25  | 23<br>24 | 22<br>23      |
| 58   | 36         | 85       | 34       | 33       | 31           | 30              | 29       | 28           | 27       | 26       | 26        | 25       | 24            |
| <i>5</i> 9<br>60                                 | 38<br>39   | 36       | 35<br>36 | 34       | 83           | 31<br>33        | 30<br>31 | 29<br>30     | 28       | 27<br>28 | 26<br>27  | 25<br>26 | 25<br>25      |
| 61   | • 40       | 39       | 37       | 36       | 35           | 94              | 32       | 31           | 30       | 29       | 28        | 27       | 26            |
| 62   | 41         | 40       | 39       | 37       | 36           | 35              | 34       | 32           | 31       | 30       | 29        | 28       | 27            |
| 1  | <u> </u>   | I        | 1        | <u> </u> | 1            | <u> </u>        | l .      | <u> </u>     | <u> </u> | l        | 1         | <u> </u> | <u> </u>      |

200 TABLE XLII.

|                              |          |          |                    | Argu     | ment      | . AI         | PAR          | ENT      | ' DIS       | ΓĄΝ           | CE.             |            |            |           |       |
|------------------------------|----------|----------|--------------------|----------|-----------|--------------|--------------|----------|-------------|---------------|-----------------|------------|------------|-----------|-------|
| Arg.<br>Parallax<br>in Alti- | Add      | the D    | ifferenc<br>Distar | e of     | the t     | wo N<br>than | Jumb<br>90°, | ers to   | ken<br>Subt | out o         | f this<br>if ab | Table      | , if th    | ne App    | arent |
| tude or<br>listance          | 52°      | 53°      | 54°                | 55°      | 56°       | 57°          | <i>5</i> 8°  | 59°      | 60°<br>120  | 65°<br>115    | 70°<br>110      | 75°<br>105 | 80°<br>100 | 85°<br>95 | 90°   |
| Min.                         | "        | "        | "                  | "        | "         | "            | "            | "        | "           | "             | "               | "          | ″          | "         | "     |
| <i>5</i><br>8                | 0        | 0        | 0                  | 0        | 0         | 0            | 0            | 0        | 0           | 0             | 0               | 0          | 0          | 0         | 0     |
| 10                           | 1        | . 1      | 1                  | 1        | 1         | 1            | 1            | 1        | 1           | 0             | 0               | 0          | 0          | 0         | 0     |
| 11<br>12                     | 1        | 1        | 1                  | 1        | 1         | 1<br>1       | 1            | 1        | 1           | 0             | 0               | 0,0        | 0          | 0         | 0     |
| 18<br>14                     | 1        | 1        | 1                  | 1        | 1         | 1            | 1<br>1       | 1<br>1   | 1           | 1             | 1<br>1          | 0          | 0          | 0         | 0     |
| 15                           | 2        | 1.       | 1                  | 1        | 1         | 1            | 1            | i        | 1           | 1             | 1               | 1          | o          | ŏ         | 0     |
| 16<br>17                     | 2<br>2   | 2 2      | 2 2                | 2 2      | 2 2       | 1<br>2       | 1 2          | 1<br>2   | 1           | 1             | 1               | 1          | 0          | 0         | 0     |
| 18                           | 2        | 2        | 2.                 | 2        | 2         | 2            | 2            | 2        | 2           | 1             | 1               | 1          | Ó          | 0         | 0     |
| 19<br>20                     | 2<br>3   | 2<br>3   | 3                  | 2 2      | 2 2       | 2<br>2       | 2            | 2        | 2           | 1<br>2        | . 1             | 1<br>1     | 1          | 0         | 0     |
| .21                          | 3<br>3   | 3        | 3<br>3             | 3        | 3         | 2 3          | 2 3          | 2 3      | 2 2         | 2 2           | 1<br>2          | 1          | 1          | 0         | 0     |
| 22<br>23                     | 4        | 3        | 3                  | 3        | 3         | 3            | 3            | 3        | 3           | 2             | 2               | 1          | 1          | 0         | 0     |
| 24<br>25                     | 4        | 4        | 4                  | 4        | 3<br>4    | 3<br>4       | 3            | 3<br>3   | 3           | 2             | 2 2             | 1          | 1          | 0         | 0     |
| 26                           | 5        | 4        | 4                  | 4        | 4         | 4            | 4            | 4        | 3           | 3             | 2               | 2          | 1          | 1         | 0     |
| 27<br>28                     | 5<br>5   | 5<br>5   | 5<br>5             | 4<br>5   | 4<br>5    | 4            | 4            | 4        | 4           | 3<br>3        | 2<br>2          | 2          | 1<br>1     | 1         | 0     |
| 29<br>30                     | 6        | 6<br>6   | 5<br>6             | 5<br>5   | 5<br>5    | 5<br>5       | 5<br>5       | 4<br>5   | 4<br>5      | 3<br>4        | 3<br>3          | 2<br>2     | 1          | 1         | 0     |
| 31                           | 7        | 6        | 6                  | 6        | 6         | 5            | 5            | 5        | 5           | 4             | 3               | 2          | 1          | 1         | 0     |
| 32<br>33                     | 7        | 7        | 6<br>7             | 6        | 6         | 6<br>6       | 6<br>6       | 5<br>6   | 5<br>5      | 4             | 3<br>3          | 2          | 2 2        | 1         | 0     |
| 34                           | 8        | 8        | 7<br>8             | 7        | 7         | 7.<br>7      | 6<br>7       | 6<br>6   | 6           | 5<br>5        | 4               | 3          | 2 2        | 1         | 0     |
| 35<br>36                     | 9        | 9        | 8                  | 8        | 8         | 7            | 7            | 7        | 7           | 5             | 4               | 3<br>3     | 2          | 1         | 0     |
| 37<br>38                     | 10       | 9<br>9   | ·9 .               | 8<br>9   | 8         | 8<br>8       | 7<br>8       | 7<br>8   | 7           | 6<br>6        | 4<br>5          | 3          | 2 2        | 1         | 0     |
| 39                           | 10       | 10       | 10                 | 9        | 9         | 9            | 8            | 8        | 8           | 6             | 5               | 4          | 2          | 1         | 0     |
| 40                           | 11       | 11       | 10                 | 10       | 9         | 9            | 9            | 8        |             | $\frac{7}{7}$ | 5<br>5          | 4          |            | 1         | 0     |
| 41<br>42                     | 11<br>12 | 11<br>12 | 11                 | 10<br>11 | 10<br>10  | 10<br>10     | 9<br>10      | 9        | 9           | 7             | 6               | 4          | 3<br>3     | 1         | 0     |
| 43<br>44                     | 13<br>13 | 12<br>13 | 12<br>12           | 11<br>12 | 11<br>11  | 10           | 10<br>11     | 10<br>10 | 9<br>10     | 8<br>8        | 6               | 4<br>5     | 3          | 1         | 0     |
| 45                           | 14       | 13       | 13                 | 12<br>13 | 12<br>12  | 11           | 11           | 11<br>11 | 10<br>11    | 8             | 6<br>7          | 5<br>5     | 3          | 2         | 0     |
| 46<br>47                     | 14<br>15 | 14<br>15 | 13<br>14           | 13       | 13        | 12<br>13     | 12<br>12     | 12       | 11          | 9             | 7               | . 5        | 3          | 2<br>2    | 0     |
| 48<br>49                     | 16<br>16 | 15<br>16 | 15<br>15           | 14<br>15 | 14<br>-14 | 13<br>14     | 13<br>13     | 12<br>13 | 12<br>12    | 9<br>10       | 7<br>8          | 5<br>6     | 4          | 2         | 0     |
| 50                           | 17       | 16       | 16                 | 15       | 15        | 14           | 14           | 13       | 13          | 10            | 8               | 6          | 4          | 2         | o     |
| 51<br>52                     | 18<br>18 | 17<br>18 | 16<br>17           | 16<br>17 | 15<br>16  | 15<br>15     | 14<br>15     | 14<br>14 | 13<br>14    | 11<br>11      | 8<br>9          | 6          | 4          | 2 2       | 0     |
| 53                           | 19       | 18       | 18                 | 17       | 17        | 16           | 15           | 15       | 14          | 11            | 9               | 7          | 4          | 2         | 0     |
| 54<br>55                     | 20<br>21 | 19<br>20 | 18<br>19           | 18       | 17<br>18  | 17<br>17     | 16<br>16     | 15<br>16 | 15<br>15    | 12            | 10              | 7          | . 5        | 2 2       | 0     |
| 56                           | 21       | 21       | 20                 | 19       | 18        | 18           | 17           | 16       | 16          | 13            | 10              | 7          | 5          | 2         | 0     |
| 57<br>58                     | 22<br>23 | 21<br>22 | 21<br>21           | 20<br>21 | 19<br>20  | 18<br>19     | 18           | 17<br>18 | 16<br>17    | 13<br>14      | 10              | 8<br>8     | 5<br>5     | 2<br>3    | 0     |
| 59<br>60                     | 24<br>25 | 23<br>24 | 22<br>23           | 21<br>22 | .20<br>21 | 20<br>20     | 19<br>20     | 18<br>19 | 18<br>18    | 14<br>15      | 11<br>11        | 8          | 5<br>6     | 3<br>3    | 0     |
| 61 62                        | 25<br>26 | 24<br>25 | 24<br>24           | 23<br>23 | 22<br>23  | 21<br>22     | 20<br>21     | 20<br>20 | 19<br>19    | 15<br>16      | 12<br>12        | 9          | 6          | 3         | 0     |

TABLE XLIII. 201 AMPLITUDES OF A CELESTIAL BODY, RECKONED FROM THE MERIDIAN.

| Arg.     |            |    | - 7                            |                | Argu                           | ment.                | DECLI          | ATION.               |                                 | <del></del>    |                |
|----------|------------|----|--------------------------------|----------------|--------------------------------|----------------------|----------------|----------------------|---------------------------------|----------------|----------------|
| Lat.     | . O.       | 1  | 10                             | 20             | 30                             | 4°                   | 5°             | 6° 7°                | 80                              | 9°             | 10°            |
| -00      | 90°        | o/ | 89° 0                          | 880 0          | 87° 0'                         | 86° 0'               | 85° 0′         | 84° 0′ 83°           | 0 82° U                         | 81° 0'         | 80° 0'         |
| 1        | 90         | o  | 89 0                           | 88 0           | 87 0                           | 86 0                 | 85 0           | 84 0 83              | 0 82 0                          | 81 0           | 80 0           |
| 2        | 90         | 0  | 89 O                           | 88 0           | 87 0                           | 86 0                 | 85 0           | 84 0 83              | 0 82 0                          | 81 0           | 80 0           |
| 3        | 90         | 0  | 89 0                           | 88 0           | 87 0                           | 86 0                 | 85 0           |                      | 59 81 59                        | 80 59          | 79 59          |
| 5        | 90<br>90   | 0  | 89 0<br>89 0                   | 88 0<br>88 0   | 87 0<br>87 0                   | 86 0<br>85 59        | 85 0<br>84 59  |                      | 59   81 59<br>58   \$1 58       | 80 59<br>80 58 | 79 59<br>79 58 |
| 6        | 90         | ŏ  | 89 0                           | 88 0           | 86 59                          | <b>85 5</b> 9        | 84 59          |                      | 58 81 58                        | 80 57          | 79 57          |
| 7        | 90         | ŏ  | 89 0                           | 87 59          | 86 59                          | <b>85</b> 58         | 84 58          |                      | 57 81 57                        | 80 56          | 79 56          |
| 8        | 90         | 0  | 89 O                           | 87 59          | 86 59                          | 85 58                | 84 57          |                      | 56 81 56                        | 80 55          | 79 55          |
| 9        | 90         | 0  | <b>89</b> 0                    | 87 59          | 86 58                          | 85 57                | 84 57          | 83 56   82           | 55 81 54                        | 80 53          | 79 58          |
| 10       | 90         | 0  | 88 59                          | 87 58          | 86 57                          | 85 56                | 84 35          | 83 54 82             | 54 81 52                        | 80 51          | 79 50          |
| 11       | 90         | 0  | 88 59                          | 87 58          | 86 57                          | 85 56                | 84 55          | 83 54 82             |                                 | 80 <i>5</i> 0  | 79 49          |
| 12       | 90         | 0  | 88 59                          | 87 57          | 86 56                          | 85 55                | 84 53          | 1                    | 51 81 49                        | 80 48          | 79 47          |
| 13<br>14 | 90<br>90   | 0  | 88 58<br>88 58                 | 87 57<br>87 56 | 86 <i>5</i> 5<br>86 <i>5</i> 5 | 85 54<br>85 53       | 84 52<br>84 51 | 83 50 82<br>83 49 82 | 49   81 48<br>47   81 45        | 80 46<br>80 43 | 79 45<br>79 42 |
| 15       | 90         | ŏ  | 88 58                          | 87 56          | 86 54                          | 85 52                | 84 49          |                      | 45 81 43                        | 80 41          | 79 39          |
| 16       | 90         | ŏ  | 88 58                          | 87 55          | 86 53                          | <b>85</b> <i>5</i> 0 | <b>84 4</b> 8  |                      | 43 81 41                        | 80 38          | 79 36          |
| 17       | 90         | 0  | 88 <i>5</i> 8                  | 87 55          | 86 52                          | 85 49                | 84 47          | 1                    | 41 81 38                        | 80 35          | 79 33          |
| 18       | 90         | 0  | 88 57                          | 87 54          | 86 51                          | 85.48                | 84 45          | 83 41 82             |                                 | 80 32          | 79 30          |
| 19       | 90         | 의  | 88 57                          | 87 53          | 86 <i>5</i> 0                  | 85 47                | 84 43          | 83 39 82             | 36 81 52                        | 80 29          | 79 26          |
| 20       | 90         | 0  | 88 56                          | 87 52          | 86 48                          | 85 45                | 84 41          | 83 37 82             | 33 81 29                        | 80 25          | 79 21          |
| 21       | 90         | 0  | 88 56                          | 87 52          | 86 47                          | 85 48                | 84 39          |                      | 30 81 26                        | 80 21          | 79 17          |
| 22<br>23 | 90<br>90   | 8  | 88 <i>5</i> 6<br>88 <i>5</i> 5 | 87 51<br>87 50 | 86 46<br>86 45                 | 85 41<br>85 39       | 84 37<br>84 34 |                      | 27   81 22<br>24   81 18        | 80 17          | 79 12<br>79 8  |
| 24       | 90         | ö  | 88 <i>55</i>                   | 87 49          | 86 43                          | 85 37                | 84 32          |                      | 20 81 14                        | 80 9           | 79 3           |
| 25       | 90         | ŏ  | 88 54                          |                | 86 42                          | 85 85                | 84 29          | 83 23 82             | 16 81 10                        | 80 4           | 78 58          |
| 26       | 90         | 0  | <b>88</b> 59                   | 87 47          | 86 40                          | 85 33                | 84 27          | 83 19 82             | 12 81 6                         | 79 59          | 78 52          |
| 27       | 90         | 0  | 88 59                          | 87 46          | 86 38                          | 85 31                | 84 24          | 83 16 82             | 8 81 1                          | 79 54          | 78 46          |
| 28<br>29 | 90<br>90   | 0  | 88 52<br>88 52                 |                | 86 36<br>86 34                 | 85 28<br>85 26       | 84 20<br>84 17 | 83 12 82<br>83 8 82  | 4 80 56<br>0 80 51              | 79 48          | 78 40<br>78 33 |
|          |            | —  |                                | -              |                                |                      |                |                      |                                 |                |                |
| 30       | 90         | 0  | 88 51                          | 87 42          | 86 32                          | 85 23<br>85 20       | 84 14          | 83 4 81<br>83 0 81   | 55 80 45                        | 79 36          | 78 27          |
| 31<br>32 | 90<br>90   | 0  | 88 <i>5</i> 0                  |                | 86 30                          | 85 17                | 84 10<br>84 6  | 1                    | 50   80 39<br>44   80 33        | 79 29          | 78 19<br>78 11 |
| 33       | 90         | ŏ  | 88 49                          |                | 86 25                          | 85 14                | 84 2           |                      | 39 80 27                        | 79 15          | 78 3           |
| 34       | <b>′90</b> | 0  | 88 48                          | 87 35          | 86 23                          | 85 10                | 83 58          | 82 45 81             | 83 80 20                        | 79 8           | 77 55          |
| 35       | 90         | 0  | 88 47                          |                | 86 20                          | 85 7                 | 83 54          | 82 40 81             | 27 80 13                        | 79 0           | 77 46          |
| 36<br>37 | 90         | 0  | 88 46<br>88 45                 |                | 86 17                          | 85 3<br>85 0         | 83 49          | 82 35 81<br>82 29 81 | 21 80 6<br>14 79 58             | 78 51<br>78 43 | 77 37<br>77 27 |
| 38       | 90         | 0  | 88 44                          |                | 86 12                          | 84 56                | 83 45          | 82 23 81             | 6 79 49                         | 78 33          | 77 27<br>77 16 |
| 39       | 90         | ŏ  | 88 49                          |                | 86 9                           | 84, 52               | 83 84          | 82 17 80             |                                 | 78 25          | 77 5           |
| 40       | 90         | 0  | 88 42                          | -              | 86 5                           | 84 47                | 83 28          | 82 10 80             | 51 79 32                        | 78 13          | 76 54          |
| 41       | 90         | 0  | 88 41                          |                | 86 2                           | 84 42                | 83 22          |                      | 43 79 23                        | 78 2           | 76 42          |
| 42       | 90         | 0  | 88 39                          |                | 85 58                          | 84 37                | 83 16          | 81 55 80             | 34 79 13                        | 77 51          | 76 29          |
| 49       | 90         | 0  | 88 38                          |                | 85 54                          | 84 32                | 83 9           | 81 47 80             | 25 79 2                         | 77 39          | 76 16          |
| 44<br>45 | 90         | 0  | 88 37                          |                | 85 50<br>85 45                 | 84 26                | 83 2<br>82 55  | 81 39 80             | 15 78 51<br>5 78 39             | 77 26          | 76 2<br>75 47  |
| 46       | 90         | 0  | 88 35<br>88 34                 |                | 85 45<br>85 41                 | 84 20<br>84 14       | 82 55<br>82 48 | 81 21 79             | 5   78 39<br>54   78 <b>2</b> 7 | 76 59          | 75 47<br>75 91 |
| 47       | 90         | ŏ  | 88 32                          |                | 85 36                          | 84 8                 | 82 39          | 81 11 79             | 42 78 13                        | 76 44          | 75 15          |
| 48       | 90         | 0  | 88 31                          |                | 85 31                          | 84 1                 | 82 31          | 81 1 79              | 90 77 59                        | 76 29          | 74 57          |
| 49       | 90         | 0  | 88 29                          | 86 57          | 85 25                          | 83 54                | 82 22          | 80 50 79             | 18 77 45                        | 76 12          | 74 39          |
| 50       | 90         | 0  | 88 2                           |                | 85 20                          | 85 46                | 82 12          | 80 39 79             | 4 .77 30                        | 75 55          | 74 20          |
| 51       | 90         | 0  | 88 2                           | 10000          | 85 14                          | 83 38                | 82 2           | 80 26 78             | 50 77 13                        | 75 36          | 73 59          |
| 52<br>53 | 90         | 0  | 88 20                          |                | 85 8<br>85 1                   | 83 50                | 81 52<br>81 40 | 80 14 78<br>80 0 78  |                                 | 75 17<br>74 56 | 73 37<br>73 14 |
| 54       | 90         | 0  | 88 18                          | 1              | 84 58                          | 83 20                | 81 28          | 80 0 78<br>79 45 78  | 2 76 18                         | 74 34          | 72 49          |
| 55       | 90         | o' | 88 1                           |                | 84 46                          | 83 1                 | 81 16          | 79 30 77             |                                 | 74 10          | 72 23          |
| 56       | 90         | 0  | 88 13                          | 86 26          | 84 38                          | 82 50                | 81 2           | 79 14 77             | 25 75 35                        | 73 45          | 71 54          |
| 57       | 90         | 0  | 88 10                          |                | 84 29                          | 82 38                | 80 47          | 78 56 77             | 4 75 12                         | 73 18          | 71 24          |
| 58<br>59 | 90         | 0  | 88 4<br>88 4                   |                | 84 20<br>84 10                 | 82 26<br>82 13       | 80 32<br>80 15 | 1                    | 42   74 47<br>19   74 19        | 72 50<br>72 19 | 70 52          |
|          |            |    |                                | -!             |                                |                      |                | ·                    |                                 | .[             |                |
| _60      | 90         | 0  | 88. (                          | 186 0          | 84 0                           | 81 59                | 79 58          | 77 56 75             | 54 78 50                        | 71 46          | 69 41          |

| Arg.             | <del></del>                    | <del></del>      | <del></del>      | Arg              | ument.             | DECLI                  | NATIO                 | N.               |                |                        |                        |
|------------------|--------------------------------|------------------|------------------|------------------|--------------------|------------------------|-----------------------|------------------|----------------|------------------------|------------------------|
| Lat.             | 110                            | 12°              | 130              | 140              | 15°                | 15330                  | 16° 0                 | 16°30            | 170 0          | 17°30                  | 180 0                  |
| 00               | 0 د79                          | 78° 0′           | 77° 0′           | 76° 0′           | 750 0              | 74030                  | 740 0                 | 1                | 73° 0′         | 72034                  |                        |
| 1 2              | 79 0<br>79 0                   | 78 O             | 77 0<br>76 59    | 76 ,0<br>75 59   | 75 0<br>74 59      | 74 30<br>74 29         | 74 0<br>73 59         | 73 30<br>73 29   | 73 0<br>72 59  | 72 30<br>72 29         | 72 0<br>71 59          |
| 3                | 78 59                          | 77 59            | 76 59            | 75 59            | 74 59              | 74 29                  | 73 59                 | 73 29            | 72 58          | 72 28                  | 71 58                  |
| 4<br>5           | 78 <i>5</i> 8<br>78 <i>5</i> 7 | 77 58<br>77 57   | 76 58<br>76 57   | 75 58<br>75 57   | 74 58<br>74 56     | 74 28<br>74 26         | 73 58<br>73 56        | 73 28<br>73 26   | 72 57<br>72 56 | 72 27<br>72 26         | 71 57                  |
| 6                | 78 <i>5</i> 6                  | 77 56            | 76 55            | 75 <b>55</b>     | 74 55              | 74 25                  | 78 55                 | 73 25            | 72 54          | 72 24                  | 71 54                  |
| 7<br>8           | 78 <i>55</i><br>78 <i>5</i> 3  | 77 54<br>77 53   | 76 54<br>76 52   | 75 54<br>75 52   | 74 53<br>74 51     | 74 25<br>74 21         | 73 53<br>73 50        | 73 22<br>73 20   | 72 52<br>72 50 | 72 22<br>72 20         | 71 52                  |
| 9                | 78 52                          | 77 51            | 76 <i>5</i> 0    | 75 50            | 74 49              | 74 18                  | 73 48                 | 73 17            | 72 47          | 72 17                  | 71 46                  |
| 10<br>11         | 78 49<br>78 47                 | 77 49<br>77 47   | 76 48            | 75 47            | 74 46<br>74 43     | 74 16                  | 73 43<br>78 42        | 73 15            | 72 44<br>72 40 | 72 14<br>72 10         | 71 43                  |
| 12               | 78 47<br>78 45                 | 77 44            | 76 43<br>76 42   | 75 44<br>75 41   | 74 43<br>74 39     | 74 12<br>74 9          | 73 42<br>73 38        | 73 11<br>73 8    | 72 37          | 72 10                  | 71 35                  |
| 13<br>14         | 78 43<br>78 40                 | 77 41<br>77 38   | 76 39<br>76 36   | 75 38<br>75 34   | 74 36<br>74 32     | 74 5<br>74 1           | 73 34<br>73 30        | 73 3<br>72 59    | 72 52<br>72 28 | 72 1<br>71 57          | 71 30                  |
| 15               | 78 37                          | 77 35            | 76 32            | 75 30            | 74 28              | 73 56                  | 79 25                 | 72 54            | 72 23          | 71 52                  | 71 20                  |
| 16<br>17         | 78 33<br>78 30                 | 77 31<br>77 27   | 76 28<br>76 24   | 75 26<br>75 21   | 74 23<br>74 18     | 73 52<br>73 46         | 73 20<br>73 15        | 72 49<br>72 43   | 72 17<br>72 12 | 71 46<br>71 40         | 71 15                  |
| 18               | 78 26                          | 77 22            | 76 19            | 75 16            | 74 13              | 73 46                  | 73 9                  | 72 38            | 72 6           | 71 34                  | 71 2                   |
| 19               | 78 22                          | 77 18            | 76 14            | 75 10            | 74 7               | 73 35                  | 73 3                  | 72 31            | 71 59          | 71 27                  | 70 55                  |
| 20<br>21         | 78 17<br>78 12                 | 77 13  <br>77 8  | 76 9<br>76 3     | 75 5<br>74 59    | 74 1<br>73 54      | 78 29<br>73 22         | 72 56<br>72 49        | 72 24<br>72 17   | 71 52<br>71 45 | 71 20<br>71 13         | 70 48<br>70 40         |
| 22               | 78 7                           | 77, 2            | 75 57            | 74 52            | 73 47              | 73 15                  | 72 49                 | 72 10            | 71 87          | 71 5                   | 70 32                  |
| 23<br>24         | 78 2<br>77 57                  | 76 57<br>76 51   | 75 51<br>75 44   | 74 45<br>74 38   | 73 40<br>73 32     | 73 7<br>72 59          | 72 34<br>72 26        | 72 2<br>71 53    | 71 29<br>71 20 | 70 56<br>70 47         | 70 23<br>70 14         |
| 25               | 77 51                          | 76 44            | 75 37            | 74 31            | 73 24              | 72 51                  | 72 17                 | 71 44            | 71 11          | 70 37                  | 70 4                   |
| 26<br><b>2</b> 7 | 77 45<br>77 38                 | 76 38<br>76 30   | 75 30<br>75 22   | 74 23<br>74 15   | 73 15<br>73 6      | 72 42<br>72 33         | 72 8<br>71 59         | 71 35<br>71 25   | 71 1           | 70 27<br>70 17         | 69 53<br>69 42         |
| 28               | 77 31                          | 76 23            | 75 14            | 74 6             | 72 57              | 72 24                  | 71 49                 | 71 15            | 70 40          | 70 6                   | 69 81                  |
| 29               | 77 24                          | 76 15            | 75 6             | 73 57            | 72 47              | 72 13                  | 71 38                 | 71 3             | 70 28          | 69 53                  | 69 18                  |
| 30<br>31         | 77 16  <br>77 8                | 76 7<br>75 58    | 74 57<br>74 47   | 73 47<br>73 36   | 72 87<br>72 25     | 72 2<br>71 50          | 71 26<br>71 15        | 70 51<br>70 39   | 70 16<br>70 3  | 69 41<br>69 28         | 69 6<br>68 52          |
| 32               | 77 0                           | 75 49            | 74 37            | 73 26            | 72 14              | 71 38                  | 71 2                  | 70 26            | 69 50          | 69 14                  | 68 88                  |
| 33  <br>34       | 76 51.<br>76 42                | 75 39 75 28      | 74 26<br>74 15   | 73 14   78 2     | 72 1<br>71 48      | 71 25<br>71 12         | 70 49<br>70 35        | 70 12<br>69 58   | 69 36<br>69 22 | 68 59<br>68 44         | 68 23<br>68 7          |
| 35               | 76 32                          | 75 18            | 74 4             | 72 40            | 71 35              | 70 <i>5</i> 8          | 70 20                 | 69 43            | 69 5           | 68 28                  | 67 50                  |
| 36<br>57         | 76 21<br>76 11                 | 75 6<br>74 54    | 73 51<br>73 38   | 72 36  <br>72 22 | 71 20              | 70 43<br>70 27         | 70 5<br>69 49         | 69 27<br>69 10   | 68 49 68 92    | 68 11<br>67 <i>5</i> 3 | 67 33<br>67 14         |
| 38               | 75 59                          | 74 42            | 73 25            | 72 7             | 70 50              | 70 11                  | 69 22                 | 68 52            | 68 13          | -67 34                 | 66 55                  |
| 39               | 75 47                          | 74 29            | 73 10            | 71 52            | 70 33              | 69 53                  | 69 14                 | 68 34            | 67 54          | 67 14                  | 66 34                  |
| 40               | 75 35  <br>75 21               | 74 15<br>74 0    | 72 55<br>72 39   | 71 35 71 18      | 70 15<br>69 57     | 69 35<br>69 16         | 68 <i>55</i><br>68 35 | 68 14<br>67 54   | 67 34<br>67 12 | 66 53<br>66 31         | 66 13<br>65 <b>5</b> 0 |
| 42               | 75 7                           | 73 45            | 72 23            | 71 0             | 69 37              | 68 55                  | 68 14                 | 67 32            | 66 50          | 66 8                   | 65 26                  |
| 43<br>41         | 74 53<br>74 37                 | 73 29 73 12      | 72 5<br>71 47    | 70 41<br>70 21   | 69 17<br>68 55     | 68 37<br>68 11         | 67 52<br>67 28        | 67 9<br>66 45    | 66 26<br>66 1  | 65 43<br>65 17         | 65 0<br>64 54          |
| 45               | 74 21                          | 72 54            | 71. 27           | 70 0             | 68 32              | 67 48                  | 67 3                  | 66 19            | 65 35          | 64 50                  | 64 5                   |
| 46<br>47         | 74 3<br>73 45                  | 72 33  <br>72 15 | 71 6             | 69 37<br>69 23   | 68 7.<br>67. 42    | 67 22<br>66 <b>5</b> 6 | 66 37<br>66 10        | 65 52<br>65 23   | 65 7<br>64 37  | 64 21<br>69 50         | 63 35<br>63 3          |
| 48               | 73 26                          | 71 54            | 70 21            | 68 48            | 67 15              | 66 27                  | 65 40                 | 64 53            | 64 6           | 63 18                  | 62 29                  |
| 49               | 73 5                           | 71 32            | 69 57            | 68 22            | 66 46              | 65 57                  | 65 9                  | 64 21            | 63 32          | 69 49                  | 61 54                  |
| 50<br>51         | 72 44  <br>72 21               | 71 8 70 42       | 69 31<br>69 3    | 67 53<br>67 23   | 66 15<br>65 42     | 65 26<br>64 52         | 64 36<br>64 1         | 63 47<br>63 11   | 62 57<br>62 19 | 62 7<br>61 27          | 61 16<br>60 85         |
| 52               | 71 57                          | 70 16            | 68 34            | 66 51            | 65 8               | 64 16                  | 63 24                 | 62 32            | 61 39          | 60 46                  | 59 59                  |
| 53<br>54         | 71 31<br>71 8                  | 69 47  <br>69 17 | 68 S<br>67 SQ    | 66 17  <br>65 42 | 64 32<br>63 53     | 63 38<br>62 57         | 62 44•<br>62 2        | 61 50            | 60 56<br>60 10 | 60 1<br>59 14          | 59 6<br>58 17          |
| 55               | 70 34                          | 68 45            | 66 54            | 65 3             | 63 10              | 62 14                  | 61 17                 | 60 19            | 59 21          | 58 23                  | 57 24                  |
| 56<br>57         | 70 S<br>69 29                  | 68 10<br>67 34   | 66 17  <br>65 37 | 64 22  <br>63 38 | 62 <b>96</b> 61 38 | 61 27<br>60 37         | 60 28<br>59 36        | 59 28  <br>58 34 | 58 28<br>57 32 | 57 27<br>56 30         | 56 27<br>55 26         |
| 53               | 68 53                          | 66 54            | 64 53            | 62 50            | 60 46              | 59 43                  | 58 40                 | 57 35            | 56 31          | 55 25                  | 54 <del>2</del> 0      |
| 59               | 68 16                          | 66 11            | 64 6             | 61 59            | 59 50              | 58 44                  | 57 39                 | 56 32            | 55 25          | 54 17                  | 53 8                   |
| 60               | 67 34                          | 65 26 L          | 63 16            | 61 4;            | 58 56              | 57 42                  | 56 99                 | 55 23            | 54 13          | 53 2                   | 51 50                  |

## AMPLITUDES OF A CELESTIAL BODY, RECKONED FROM THE MERIDIAN.

| Arg.       | 1                     |                       |                | Argu                          | ment.                         | DECLIN                        | IATION           |                    |                     |                    |                                |
|------------|-----------------------|-----------------------|----------------|-------------------------------|-------------------------------|-------------------------------|------------------|--------------------|---------------------|--------------------|--------------------------------|
| Lat.       | 18°30'                | 19° 0'                | 19030          | 20° 0′                        | 20030/                        | 21° 0'                        | 21030            |                    | 22~30               | 232 0              | 230 28                         |
| 00         | 71°50′                | 71° 0'                | 70° 30′        | 70° 0!                        | 69°30′                        | 69° 0'                        | 68°30′           | 69 <sup>5</sup> 0' | 67 <sup>5</sup> 30′ | 67° 0'             | 66°3_                          |
| 1          | 71 30                 | 71 0                  | 70 30          | 70 0                          | 69 30                         | 69 0                          | 68 30            | 68 0               | 67 30               | 67 0               | 66 32                          |
| 2          | 71 29                 | 70 59                 | 70 29          | 69 59                         | 69 29                         | 68 59                         | 68 29            | 67 59              | 67 <b>2</b> 9       | 66 59              | 66 31                          |
| 3          | 71 28                 | 70 58                 | 70 28          | 69 58                         | 69 28                         | <b>68</b> , <b>5</b> 8        | 68 28            | 67 58              | 67 28               | 66 <b>5</b> 8      | 66 30                          |
| 4          | 71 27                 | 70 57                 | 70 27          | 69 57                         | 69 27                         | 68 57                         | 68 27            | 67 57              | 67 27               | 66 56              | 66 28                          |
| 6          | 71 26<br>71 24        | 70 55<br>70 53        | 70 25<br>70 23 | 69 <i>55</i><br>69 <i>5</i> 3 | 69 25<br>69 23                | 68 <i>55</i><br>68 <i>5</i> 3 | 68 25<br>68 23   | 67 55<br>67 52     | 67 25<br>67 22 :    | 66 54<br>65 52     | 66 26<br>66 24                 |
| 7          | 71 21                 | 70 51                 | 70 23          | 69 51                         | 69 20                         | 68 <b>5</b> 0                 | 68 20            | 67 49              | 67 19               | 66 49              | 66 21                          |
| 8          | 71 19                 | 70 48                 | 70 18          | 69 48                         | 69 17                         | 68 47                         | 68 17            | 67 46              | 67 16               | 66 46              | 66 17                          |
| 9          | 71 16                 | 70 45                 | 70 15          | 69 44                         | 69 14                         | 68 49                         | 68 13            | 67 48              | 67 12               | 66-42              | 66 13                          |
| 10         | 71 13                 | 70 42                 | 70 12          | 69 41                         | 69 10                         | 68 40                         | 68 9             | 67 39              | 67 8                | 66 87              | 66 9                           |
| 11         | 71 9                  | 70 38                 | 70 7           | 69 36                         | 69 6                          | 68 35                         | 68 5             | 67 34              | 67 8                | 66 32              | 66 4                           |
| 12         | 71 5                  | 70 34                 | 70 3           | 69 32                         | 69 1                          | G8 SO                         | 68 0             | 67 29              | 66 58               | 66 27              | G5 59                          |
| 13         | 70 0                  | 70 29                 | 69 <i>5</i> 8  | 69 27                         | 68 <b>5</b> 6                 | 68 25                         | 67 54            | 67 23              | 66 52               | 66 21              | 65 53                          |
| 14         | 70 <i>55</i><br>70 49 | 70 24                 | 69 53          | 69 22                         | 68 51                         | 68 19                         | 67 48            | 67.18              | 66 46               | 66 15              | 65 46                          |
| 16         | 70 49<br>70 44        | 70 18<br>70 12        | 69 47<br>69 41 | 69 16 69 9                    | 68 45<br>68 38                | 68 13<br>68 7                 | 67 42  <br>67 36 | 67 11<br>67 4      | 66 40<br>66 33      | 66 8<br>66 1       | 65 39<br>65 32                 |
| 17         | 70 37                 | 70 6                  | 69 34          | 69 2                          | 68 31                         | 68 0                          | 67 28            | 66 56              | 66 25               | 65 <b>5</b> 3      | 65 24                          |
| 18         | 70 31                 | 69 59                 | 69 27          | 68 55                         | 68 24                         | 67 52                         | 67 20            | 66 48              | 66 17               | 65 45              | 65 15                          |
| 19         | 70 23                 | 69 52                 | 69 20          | 68 47                         | 68 16                         | 67 44                         | 67 12            | 66 39              | 66 8                | 65 36              | <b>65</b> 6                    |
| 20         | 70 16                 | 69 44                 | 69 12          | 68 39                         | 68 7                          | 67 35                         | 67 3             | 66 30              | 65 58               | 65 26              | 64 56                          |
| 21         | 70 8                  | 69 36                 | 69 3           | 68 30                         | 67 58                         | 67 26                         | 65 53            | 66 20              | 65 48               | 65 15              | 64 45                          |
| 22         | 69 59                 | 69 27                 | 68 54          | 68 21                         | 67 48                         | 67 16                         | 66 43            | 66 10              | 65 37               | 65 4               | 64 34                          |
| 23         | 69 50                 | 69 17                 | 68 44          | 68 11                         | 67 38                         | 67 5                          | 66 32            | 65 59              | 65 26               | 64 53              | 64 22                          |
| 24<br>25   | 69 41<br>69 3)        | 69 7<br>68 57         | 68 34<br>68 23 | 68 1<br>67 50                 | 67 28 67 16                   | 66 54<br>66 42                | 66 21  <br>66 9  | 65 47<br>65 36     | 65 14 65 1          | 64 41<br>64 28     | 64 9<br>63 56                  |
| 26         | 69 20                 | 68 46                 | 68 12          | 67 38                         | 67 4                          | 66 30                         | 65 56            | 65 22              | 64 48               | 64 14              | 63 42                          |
| 27         | 69 8                  | 68 34                 | 68 0           | 67 26                         | 66 51                         | 66 17                         | 65 43            | 65 8               | 64 34               | 63 59              | 63 27                          |
| 28         | 68 57                 | 68 22                 | 67 48          | 67 13                         | 66 38                         | 66 3                          | 65 29            | 64 54              | 64 19               | 63 44              | 63 11                          |
| 29         | 68 44                 | 68 9                  | 67 33          | 66 59                         | 66 24                         | 65 49                         | 65 14            | 64 38              | 64 3                | 63 28              | 62 <b>55</b>                   |
| 30         | 68 30                 | 67 55                 | 67 20          | 66 44                         | 66 9                          | 65 33                         | 64 58            | 64 21              | 63 47               | 68 11              | 62 37                          |
| 31         | 68 16                 | 67 40                 | 67 5           | 66 29                         | 65 53                         | 65 17                         | 64 41            | 64 5               | 63 29               | 62 58              | 62 19                          |
| 32         | 68 2                  | 67 25                 | 66 49          | 66 13                         | 65 36                         | 65 0                          | 64 24            | 63 47              | 63 10               | 62 34              | 62 0                           |
| 33<br>34   | 67 46<br>67 30        | 67 9<br>66 <b>5</b> 3 | 66 33<br>66 15 | 65 56<br>65 38                | 65 19<br>65 1                 | 64 42<br>64 29                | 64 5<br>63 46    | 63 28  <br>63 8    | 62 51<br>62 31      | 62 14<br>61 53     | 61 <b>3</b> 9                  |
| 35         | 67 13                 | 66 35                 | 65 57          | 65 19                         | 64 41                         | 64 3                          | 63 25            | 62 47              | 62 9                | 61 31              | 60 55                          |
| 36         | 66 54                 | 66 16                 | 65 38          | 64 59                         | 64 21                         | 63 42                         | 63 4             | 62 25              | 61 46               | 61 7               | 60 30                          |
| 37         | 66 3 <i>5</i>         | 65 57                 | 65 18          | 64 39                         | 64 0                          | 63 20                         | 62 41            | 62 2               | 61 22               | 60 43              | 60 5                           |
| 38         | 66 15<br>65 54        | 65.36                 | 64 56          | 64 17                         | 63 37                         | 62 57                         | 62 17            | 61 37              | 60 57               | 60 16              | <i>5</i> 9 <b>3</b> 9          |
| 39         |                       | 65 14                 | 64 94          | 63 53                         | 63 13                         | 62 32                         | 61 52            | 61 11              | 60 30               | 59 49              | 59 11                          |
| 40         | 65 32                 | 64 51                 | 64 10          | 63 29                         | 62 48                         | 62 6                          | 61 25            | 60 49              | 60 2                | 59 20              | 58 41                          |
| 41<br>42   | 65 8<br>64 43         | 64 27<br>64 1         | 63 45          | 63 3                          | 62 21                         | 61 39                         | 60 57            | 60 14              | 59 32               | 58 49              | 58 9<br>57 <b>3</b> 6          |
| 43         | 64 17                 | 63 34                 | 63 18 62 51    | 62 36  <br>62 7               | 61 53                         | 61 10                         | 60 27<br>59 55   | 59 44  <br>59 11   | 59 0<br>58 27       | 58 17<br>57 42     | <i>57</i> <b>36</b> 57 1       |
| 44         | 63 49                 | 63 5                  | 62 21          | 61 36                         | 60 52                         | 60 7                          | 59 22            | 58 37              | 57 51               | 57 6               | 56 23                          |
| 45         | 63 20                 | 62 35                 | 61 50          | 61 4                          | 60 19                         | 59 33                         | 58 47            | 58 1               | 57 14               | 56 27              | 55 <b>4</b> 3                  |
| 46         | 62 49                 | 62 3                  | 61 17          | 60 30                         | 59 44                         | 58 57                         | 58 9             | 57 22              | 56 34               | 55 46              | 55 1                           |
| 47         | 62 16                 | 61 29                 | 60 42          | 59 54                         | 59 6                          | 58 18                         | 57 <b>3</b> 0    | 56 41              | 55 52               | 55 8               | 54 16                          |
| 48 49      | 61 <b>4</b> 9         | 60 53<br>60 15        | 60 4<br>59 24  | 59 16<br>58 35                | 58 26 57 44                   | 57 37  <br>56 54              | 56 47<br>56 3    | 55 57  <br>55 11   | 55 7<br>54 19       | 54 16 53 27        | 53 <b>2</b> 9<br>52 <b>3</b> 8 |
|            |                       |                       |                |                               |                               |                               |                  | !                  |                     |                    |                                |
| 50  <br>51 | 60 25<br>59 43        | 59 54<br>59 51        | 58 42<br>57 58 | 57 51                         | 56 59                         | 56 7<br>55 17                 | 55 14            | 54 22              | 53 28<br>52 32      | 52 34              | 51 48                          |
| 52         | 59 43<br>58 59        | 58 4                  | 57 58<br>57 10 | 57 5<br>56 15                 | 56 11 55 20                   | 55 17  <br>54 24              | 54 23  <br>53 28 | 53 28<br>52 31     | 52 32 51 54         | 51 37 50 <b>36</b> | 50 45<br>49 42                 |
| <b>5</b> 3 | 58 11                 | 57 15                 | 56 19          | 55 22                         | 54 24                         | 53 27                         | 52 29            | 51 30              | 50 50               | 49 31              | 48 34                          |
| 54         | 57 20                 | 56 22                 | 55 24          | 54 25                         | 53 26                         | 52 26                         | 51 26            | 50 24              | 49 23               | 48 20              | 47 21                          |
| 55         | 56 25                 | 55 25                 | 54 25          | 53 24                         | 52 22                         | 51 20                         | 50 17            | 49 13              | 48 8                | 47 4               | 46 2                           |
| 56         | 55 26                 | 54 24                 | 53 21          | 52 18                         | 51 13                         | 50 9                          | 49 3             | 47 56              | 46 49               | 45 40              | 44 36                          |
| 57<br>58   | 54 22<br>53 12        | 53 18<br>52 6         | 52 12<br>50 57 | 51 6<br>49 48                 | 49 <i>5</i> 9   48 <i>5</i> 8 | 48 51<br>47 27                | 47 42<br>46 14   | 46 33  <br>45 1    | 45 22 43 46         | 44 9 42 90         | 43 1<br>41 17                  |
| 59         | 51 58                 | 50 48                 | 49 36          | 48 23                         | 47 10                         | 45 54                         | 44 38            | 43 20              | 42 1                | 40 39              | 39 22                          |
| 60         | 50 S6                 | 49 23                 | 48 7           | 46 50                         |                               | 44 13                         | 42 52 (          |                    | 40 3                | 38 36              | 37 13                          |
| - VO 1     | J-0 J-0               | 79 Z3 (               | 10 / )         | -TO 50 1                      | 30 0Z I                       | 13                            | 12 3Z (          | X1 30              | - J                 | 30 30 (            | J, 1.5                         |

TABLE XLIV.

TO FIND THE TIME OF RISING AND SETTING OF A CELESTIAL OBJECT.

| Arg.   |  |  | Argur  | nent. I  | DECLIN   | ATION.   | <del></del>  |  |  | · ·  |
|--|--|--|--|--|--|--|--|--|--|--|
| Lat.   | υ°   | 10 20  | 3°   | 40   | <i>5</i> °   | 6°   | 70   | 8º   | 90   | 100  |
| 0° 1 2 3 4 5 6 7   | 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0              | Gh O' 6 O' 6 O 6 O 6 O 6 O 6 O 6 O 6 O 6 O   | 6h 0'<br>6 0<br>6 0<br>6 0<br>6 1<br>6 1<br>6 1<br>6 1                       | 6h (y') 6 0 6 0 6 1 6 1 6 1 6 2 6 2  | 6 <sup>h</sup> 0'<br>6 0<br>6 0<br>6 1<br>6 1<br>6 2<br>6 2<br>6 2           | 6h C' 6 0 6 1 6 1 6 2 6 2 6 3 6 3  | 6h 0'<br>6 0<br>6 1<br>6 1<br>6 2<br>6 2<br>6 3<br>6 3                       | 6h 0' 6 0 6 1 6 2 6 3 6 3 6 4  | 6h O'<br>6 1<br>6 1<br>6 2<br>6 3<br>6 3<br>6 4                              | 6h O'<br>6 1<br>6 1<br>6 2<br>6 3<br>6 4<br>6 4<br>6 5                       |
| 9  |  | 6 0 6 1<br>6 1 6 1   | 6 2  | 6 2<br>6 2   | 6 3<br>6 8   | 6 3<br>6 4   | 6 4<br>6 4   | 6 <b>4</b> 6 5   | 6 5<br>6 6   | 6 6<br>6 6   |
| 10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18       | 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0              | 6 1 6 1<br>6 1 6 2<br>6 1 6 3           | 6 2<br>6 2<br>6 3<br>6 3<br>6 3<br>6 3<br>6 4<br>6 4                         | 6 3 6 6 4 6 6 5 5 6 6 5 6  | 6 4 6 4 6 5 5 6 6 6 6 6 7  | 6 4<br>6 5<br>6 5<br>6 6<br>6 6<br>6 7<br>6 7<br>6 8<br>6 8                  | 6 5<br>6 5<br>6 6<br>6 6<br>6 7<br>6 8<br>6 8<br>6 9<br>6 9                  | 6 6 6 6 7 6 7 6 8 6 9 6 10 6 11  | 6 6 6 7 6 8 6 9 6 10 6 11 6 12 6 13  | 6 7<br>6 8<br>6 9<br>6 9<br>6 10<br>6 11<br>6 11<br>6 12<br>6 13<br>6 14     |
| 20<br>21<br>22<br>23<br>24<br>25<br>26<br>27<br>28<br>29 | 6 0 6<br>6 0 6<br>6 0 6<br>6 0 6                     | 6 1 6 3<br>6 1 6 3<br>6 2 6 3<br>6 2 6 3<br>6 2 6 3<br>6 2 6 4<br>6 3 6 4<br>6 2 6 4<br>6 2 6 4<br>6 2 6 4           | 6 4<br>6 5<br>6 5<br>6 6<br>6 6<br>6 6<br>6 7                                | 6 6 6 6 6 7 6 7 6 8 6 8 6 9 6 9  | 6 7 6 8 6 9 6 9 6 10 6 10 6 11 6 11  | 6 9<br>6 9<br>6 10<br>6 10<br>6 11<br>6 11<br>6 12<br>6 12<br>6 13<br>6 13   | 6 10<br>6 11<br>6 11<br>6 12<br>6 13<br>6 13<br>6 14<br>6 14<br>6 15<br>6 16 | 6 12<br>6 13<br>6 14<br>6 14<br>6 15<br>6 16<br>6 16<br>6 17<br>6 18         | 6 13<br>6 14<br>6 15<br>6 15<br>6 16<br>6 17<br>6 18<br>6 19<br>6 19<br>6 20 | 6 15<br>6 16<br>6 16<br>6 17<br>6 18<br>6 19<br>6 20<br>6 21<br>6 22<br>6 23 |
| 30<br>31<br>32<br>33<br>34<br>35<br>36<br>37<br>38<br>39 | 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0              | 6 2 6 5<br>6 2 6 5<br>6 2 6 5<br>6 3 6 5<br>6 3 6 6<br>6 3 6 6<br>6 3 6 6<br>6 3 6 6<br>6 3 6 6                      | 6 7<br>6 7<br>6 8<br>6 8<br>6 8<br>6 8<br>6 9<br>6 9<br>6 9                  | 6 9<br>6 10<br>6 10<br>6 10<br>6 11<br>6 11<br>6 12<br>6 12<br>6 13<br>6 13  | 6 12<br>6 13<br>6 13<br>6 14<br>6 14<br>6 15<br>6 15<br>6 16                 | 6 14<br>6 15<br>6 15<br>6 16<br>6 16<br>6 17<br>6 18<br>6 18<br>6 19<br>6 20 | 6 16<br>6 17<br>6 18<br>6 18<br>6 19<br>6 20<br>6 20<br>6 21<br>6 22<br>6 23 | 6 19<br>6 19<br>6 20<br>6 21<br>6 22<br>6 23<br>6 23<br>6 24<br>6 25<br>6 26 | 6 21<br>6 22<br>6 23<br>6 24<br>6 25<br>6 25<br>6 26<br>6 27<br>6 28<br>6 29 | 6 23<br>6 24<br>6 25<br>6 26<br>6 27<br>6 28<br>6 29<br>6 31<br>6 32<br>6 33 |
| 40<br>41<br>42<br>43<br>44<br>45<br>46<br>47<br>48<br>49 | 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0              | 6 3 6 7<br>6 3 6 7<br>6 4 6 7<br>6 4 6 8<br>6 4 6 8<br>6 4 6 8<br>6 4 6 8<br>6 4 6 9<br>6 5 6 9                      | 6 10<br>6 10<br>6 11<br>6 11<br>6 12<br>6 12<br>6 12<br>6 13<br>6 13         | 6 13<br>6 14<br>6 14<br>6 15<br>6 15<br>6 16<br>6 17<br>6 17<br>6 18<br>6 18 | 6 17<br>6 17<br>6 18<br>6 19<br>6 19<br>6 20<br>6 21<br>6 22<br>6 22<br>6 23 | 6 21<br>6 21<br>6 22<br>6 22<br>6 23<br>6 24<br>6 25<br>6 26<br>6 27<br>6 28 | 6 24<br>6 25<br>6 25<br>6 26<br>6 27<br>6 28<br>6 29<br>6 30<br>6 31<br>6 32 | 6 27<br>6 28<br>6 29<br>6 30<br>6 31<br>6 32<br>6 53<br>6 35<br>6 36<br>6 37 | 6 31<br>6 32<br>6 33<br>6 34<br>6 35<br>6 36<br>6 38<br>6 39<br>6 41<br>6 42 | 6 34<br>6 35<br>6 37<br>6 38<br>6 39<br>6 41<br>6 42<br>6 43<br>6 45         |
| 50<br>51<br>52<br>53<br>54<br>55<br>56<br>57<br>58<br>59 | 6 0<br>6 0<br>6 0<br>6 0<br>6 0<br>6 0<br>6 0<br>6 0 | 6 5 6 10<br>6 5 6 10<br>6 5 6 10<br>6 5 6 11<br>6 6 6 11<br>6 6 6 11<br>6 6 6 12<br>6 6 6 12<br>6 6 6 13<br>6 7 6 13 | 6 14<br>6 15<br>6 15<br>6 16<br>6 17<br>6 17<br>6 18<br>6 19<br>6 19<br>6 20 | 6 19<br>6 20<br>6 21<br>6 21<br>6 22<br>6 23<br>6 24<br>6 25<br>6 26<br>6 27 | 6 24<br>6 25<br>6 26<br>6 27<br>6 28<br>6 29<br>6 30<br>6 31<br>6 32<br>6 33 | 6 29<br>6 30<br>6 31<br>6 32<br>6 33<br>6 35<br>6 36<br>6 37<br>6 39<br>6 40 | 6 34<br>6 35<br>6 36<br>6 38<br>6 39<br>6 40<br>6 42<br>6 44<br>6 45<br>6 47 | 6 39<br>6 40<br>6 41<br>6 43<br>6 45<br>6 46<br>6 48<br>6 50<br>6 52<br>6 54 | 6 44<br>6 45<br>6 47<br>6 49<br>6 50<br>6 52<br>6 54<br>6 56<br>6 59<br>7 1  | 6 49<br>6 50<br>6 52<br>6 54<br>6 56<br>6 58<br>7 1<br>7 3<br>7 6<br>7 8     |

TABLE XLIV.

## TO FIND THE TIME OF RISING AND SETTING OF A CELESTIAL OBJECT.

| Arg.<br>Lat. | 11° 6h O' 6 1 6 1 | 12°<br>6h 0' | 130            | 140          | ment.        | 15°30′       | 16° 0'       | 160:30       | 170 0        | 17530        | 180 0                     |
|--------------|-------------------|--------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------------------|
| 1 2          | 6 1               | _            | 0) 0           |              |              |              |              |              |              |              |                           |
| 2            |                   |              | 64 0           | 6n U'        | 6h O'        | 6h 0/        | 6h 0'        | 6h U         | 60 U         | 6h 0'        | 6h 0'                     |
|              |                   | 6 1          | 6 1            | 6 1          | 6 1          | 6 1          | 6 1          | 6 1          | 6 1          | 6 1          | 6 1                       |
| 1            | 6 2               | 6 2          | 6 2            | 6 2          | 6 2          | 6 .2         | 6 2          | 6 2<br>6 4   | 6 2          | 6 3          | 6 3<br>6 4                |
| 4            | 6 3               | 6 3          | 6 4            | 6 4          | 6 4          | 6 4          | 6 3          | 6 5          | 6 5          | 6 5          | 6 5                       |
| 5            | 6 4               | 6 4          | 6 5            | 6 5          | 6 5          | 6 5          | 6 6          | 6 6          | 6 6          | 6 6          | 6 7                       |
| 6 7          | 6 5               | 6 5          | 6 6            | 6 6          | 6 6          | 6 7          | 6 7          | 6 7          | 6 7          | 68           | 6 8<br>6 9                |
| 8            | 6 6               | 6 7          | 6 6            | 6 7          | 6 8<br>6 9   | 68           | 6 '8<br>6 '9 | 6 8          | 6 9<br>6 10  | 6 10         | 6 10                      |
| 9            | 6 7               | 6 8          | 6 8            | 6 9          | 6 10         | 6 10         | 6 10         | 6 11         | 6 11         | 6 12         | 6 12                      |
| 10           | 6 8               | 6 9          | 6 9            | 6 10         | 6 11         | 6 11         | 6 12         | 6 12         | 6 12         | 6 13         | 6 13                      |
| 11           | 6 9               | 6 9          | 6 10           | 6 11         | 6 12         | 6 12         | 6 13         | 6 13         | 6 14         | 6 14         | 6 14                      |
| 12           | 6 9 6 10          | 6 10         | 6 11           | 6 12         | 6 13<br>6 14 | 6 13         | 6 14         | 6 14         | 6 15<br>6 16 | 6 15<br>6 17 | 6 16<br>6 17              |
| 14           | 6 11              | 6 12         | 6 12<br>6 13   | 6 13<br>6 14 | 6 15         | 6 15<br>6 16 | 6 15<br>6 16 | 6 16<br>6 17 | 6 16         | 6 18         | 6 19                      |
| 15           | 6 12              | 6 13         | 6 14           | 6 15         | 6 16         | 6 17         | 6 18         | 6 18         | 6 19         | 6 19         | 6 30                      |
| 16           | 6 13              | 6 14         | 6 15           | 6 16         | 6 18         | 6 18         | 6 19         | 6 19         | 6 20         | 6 21         | 6 21                      |
| 18           | 6 14              | 6 15<br>6 16 | 6 16<br>6 17   | 6 17<br>6 19 | 6 19<br>6 20 | 6 19<br>6 21 | 6 23<br>6 21 | 6 21<br>6 22 | 6 21<br>6 22 | 6 22<br>6 23 | 6 23<br>6 24              |
| 19           | 6 15              | 6 17         | 6 18           | 6 20         | 6 21         | 6 22         | 6 23         | 6 23         | 6 24         | 6 25         | 6 26                      |
| 20           | 6 16              | 6 18         | 6 19           | 6 21         | 6 22         | 6 23         | 6 21         | 6 25         | 6 25         | 6 26         | 6 27                      |
| 21<br>22     | 6 17<br>6 18      | 6 19         | 6 20           | 6 22         | 6 24         | 6 24         | 6 25         | 6 26         | 6 27         | 6 28         | 6 29                      |
| 23           | 6 19              | 6 20<br>6 21 | 6 21<br>6 23   | 6 23<br>6 24 | 6 25<br>6 26 | 6 26         | 6 27<br>6 28 | 6 27         | 6 28         | 6 29         | 6 30                      |
| 24           | 6 20              | 6 22         | 6 24           | 6 25         | 6 27         | 6 28         | 6 29         | 6 30         | 6 31         | 6 32         | 6 33                      |
| 25<br>26     | 6 21              | 6 23         | 6 25           | 6 27         | 6 29         | 6 30         | 6 SI         | 6 32         | 6 33         | 6 34         | 6 35                      |
| 27           | 6 22<br>6 23      | 6 24<br>6 25 | 6 26<br>6 27   | 6 23<br>6 29 | 6 30<br>6 31 | 6 31<br>6 32 | 6 32<br>6 34 | 6 33         | 6 34         | 6 35         | 6 36                      |
| 28           | 6 24              | 6 26         | 6 28           | 6 30         | 6 33         | 6 34         | 6 35         | 6 36         | 6 37         | 6 39         | 6 40                      |
| 29           | 6 25              | 6 27         | 6 29           | 6 32         | 6 34         | 6 35         | 6 37         | 6 38         | 6 39         | 6 40         | 6 42                      |
| 30           | 6 26              | 6 28         | 6 31           | 6 33         | 6 36         | 6 37         | 6 38         | 6 39         | 6 41         | 6 42         | 6 43                      |
| 31<br>32     | 6 27              | 6 29         | 6 32           | 6 34         | 6 37         | 6 38         | 6 40         | 6 41         | 6 42         | 6 44         | 6 45                      |
| . 83         | 6 28<br>6 29      | 6 31<br>6 32 | 6 33<br>6 34   | 6 36<br>6 37 | 6 39<br>6 40 | 6 40<br>6 41 | 6 41<br>6 43 | 6 43         | 6 44         | 6 46<br>6 47 | 6 47                      |
| 34           | 6 30              | 6 33         | 6 36           | 6 39         | 6 42         | 6 43         | 6 45         | 6 46         | 6 48         | 6 49         | 6 51                      |
| 35           | 6 31              | 6 34         | 6 37           | 6 40         | 6 43         | 6 45         | 6 46         | 6 <b>4</b> 8 | 6 49         | 6 51         | 6 53                      |
| 36<br>37     | 6 32              | 6 36<br>6 37 | 6 39<br>6 40   | 6 42<br>6 43 | 6 45 6 47    | 6 46<br>6 48 | 6 48<br>6 50 | 6 50         | 6 51         | 6 53<br>6 55 | 6 <i>5</i> 5 6 <i>5</i> 7 |
| 38           | 6 35              | 6 38         | 6 42           | 6 45         | 6 48         | 6 50         | 6 52         | 6 53         | 6 55         | 6 57         | 6 59                      |
| 30           | 6 36              | 6 40         | 6 43           | 6.47         | 6 <i>5</i> 0 | 6 52         | 6 54         | 6 55         | 6 57         | 6 59 .       | 7 1                       |
| 40           | 6 38              | 6 41         | 6 45           | 6 48         | 6 52         | 6 54         | 6 56         | 6 58         | 7 0          | 71           | 7 3                       |
| 41<br>42     | 6 39<br>6 40      | 6 43         | 6 46           | 6 50         | 6 54         | 6 56         | 6 58         | 7 0          | 7 2          | 7 4          | 7 6                       |
| 43           | 6 42              | 6 46         | 6 48<br>6 50   | 6 52<br>6 54 | 6 56<br>6 58 | 6 58<br>7 0  | 7 0          | 7 2          | 7 6          | 7 6          | 7 8                       |
| 44           | 6 43              | 6 47         | 6 52           | 6 56         | 7 0          | 7 2          | 7 4          | 7 6          | 7 9          | 7 11,        | 7 13                      |
| 45<br>46     | 6 45<br>6 46      | 6 49         | 6 53           | 6 58         | 7 2          | 7 4          | 7 7          | 7 9          | 7 11         | 7 14         | 7 16                      |
| 47           | 6 48              | 6 51<br>6 53 | 6 55 .<br>6 57 | 70           | 7 4          | 7 7 7 9      | 7 9<br>7 12  | 7 11 7 14    | 7 14         | 7 16         | 7 19<br>7 22              |
| 48           | 6 50              | 6 55         | 6 59           | 7 4          | 7 9          | 7 12         | 7 14         | 7 17         | 7 19         | 7 22         | 7 25                      |
| 49           | 6 52              | 6 57         | 7 2            | 7 7          | 7 12         | 7 14         | 7 17         | 7 20         | 7 22         | 7 25         | 7 28                      |
| <b>5</b> 0   | 6 54              | 6 59         | 7 4            | 7 9          | 7 14         | 7 17         | 7 20         | 7 23         | 7 25         | 7 28         | 7 31                      |
| 51<br>52     | 6 56<br>6 58      | 7 1 7 3      | 7 6 7 9        | 7 12<br>7 14 | 7 17<br>7 20 | 7 20<br>7 23 | 7 23<br>7 26 | 7 26<br>7 29 | 7 29<br>7 32 | 7 32<br>7 35 | 7 35<br>7 38              |
| 53           | 7 0               | 7 6          | 7 11           | 7 17         | 7 23         | 7 26         | 7 29         | 7 33         | 7 36         | 7 39         | 7 42                      |
| 54           | 7 2               | 7 8          | 7 14           | 7 20         | 7 27         | 7 30         | 7 33         | 7 36         | 7 40         | 7 43         | 7 46                      |
| 55<br>56     | 7 4               | 7 10<br>7 13 | 7 17 7 20      | 7 23<br>7 27 | 7 30<br>7 34 | 7 34<br>7 37 | 7 37 7 41    | 7 40<br>7 44 | 7 44 7 48    | 7 47<br>7 51 | 7 51<br>7 55              |
| 57           | 7 10              | 7 16         | 7 23           | 7 30         | 7 58         | 7 41         | 7 45         | 7 48         | 7 52         | 7 56         | 8 0                       |
| 58           | 7 13              | 7 20         | 7 27           | 7 34         | 7 42         | 7 46         | 7 49         | 7 53         | 7 57         | 8 1          | 8 5                       |
| 59           | 7 16              | 7 23         | 7 30           | 7 38         | 7 46         | 7 50         | 7 54         | 7 58         | 8 3          | 8 7          | 8 11                      |
| 60           | 7 19              | 7 26         | 7 34           | 7 42         | 7 51         | 7 55         | 7 59         | 8 4          | 8 8          | 8 12         | 8 17                      |

TABLE XLIV.

### TO FIND THE TIME OF RISING AND SETTING OF A CELESTIAL OBJECT.

| Arg.       |              |              |                     | Argu         | ment.                | DECLIN       | ATION        |              |              |              |                |
|------------|--------------|--------------|---------------------|--------------|----------------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Lat.       | 18230        | 19° 0'       | 19030               | 200 0        | 20730/               | 210 0        | 21230        | 220 0        | 22-30        | 230 0        | 230 28         |
| 00         | 6h 0f        | 6" 0         | - 6 <sup>n</sup> 0' | 6h 0'        | 6h 0'                | 6h 0'        | 6h 0'        | 6h 0'        | 6h 0'        | 6h 0'        | 6h 0'          |
| 1          | 6 1          | 6 1          | 6 1                 | 6 1          | 6 1                  | 6 2          | 6 2          | 6 2          | 6 2          | 6 2          | 6 2            |
| . 2        | 6 3          | 6 3          | 6 3                 | 6 3          | 6 8<br>6 4           | 6 5          | 6 3          | 6 3          | 6 3<br>6 5   | 6 3          | 6 5            |
| 4          | 6 5          | 6 5          | 6 6                 | 6 6          | 6 6                  | 6 6          | 6 6          | 6 6          | 6 7          | 6 7          | 6 7            |
| 5          | 6 7          | 6 7          | 6 7                 | 6 7          | 6 7                  | 6 8          | 6 8          | 6 8          | 6 8          | 6 9          | 6 9            |
| 6          | 6 8          | 6 8          | 6 9                 | 6 9          | 6 9                  | 6 9          | 6 10         | 6 10         | 6 10         | 6 10         | 6 10 1<br>6 12 |
| 7 8        | 6 9<br>6 11  | 6 10<br>6 11 | 6 10<br>6 11        | 6 10<br>6 12 | 6 11<br>6 12         | 6 11<br>6 12 | 6 11<br>6 13 | 6 11<br>6 13 | 6 12         | 6 12         | 6 14           |
| 9          | 6 12         | 6 13         | 6 13                | 6 14         | 6 14                 | 6 14         | 6 14         | 6 15         | 6 15         | 6 15         | 6 16           |
| 10         | 6 14         | 6 14         | 6 14                | 6 15         | 6 15                 | 6 16         | 6 16         | 6 16         | 6 17         | 6 17         | 6 18           |
| 11         | 6 15         | 6 15         | 6 16                | 6 16         | 6 17                 | 6 17         | 6 18         | 6 18         | 6 18         | 6 19         | 6 19           |
| 12<br>13   | 6 16<br>6 18 | 6 17<br>6 18 | 6 17<br>6 19        | 6 18         | 6 18<br>6 <b>2</b> 0 | 6 19         | 6 19         | 6 20<br>6 21 | 6 20         | 6 21         | 6 21<br>6 23   |
| 14         | 6 19         | 6 20         | 6 19<br>6 20        | 6 19<br>6 21 | 6 21                 | 6 20<br>6 22 | 6 21<br>6 23 | 6 23         | 6 24         | 6 22         | 6 25           |
| 15         | 6 21         | 6 21         | 6 22                | 6 22         | 6 23                 | 6 24         | 6 24         | 6 25         | 6 25         | 6 26         | 6 27           |
| 16         | 6 22<br>6 23 | 6 23         | 6 23                | 6 24         | 6 25                 | 6 25         | 6 26         | 6 27         | 6 27         | 6 28         | 6 29<br>6 13   |
| 17<br>18   | 6 23<br>6 25 | 6 24<br>6 26 | 6 25<br>6 26        | 6 25<br>6 27 | 6 26<br>6 28         | 6 27<br>6 29 | 6 28<br>6 29 | 6 28         | 6 29<br>6 31 | 6 32         | 6 32           |
| 19         | 6 26         | 6 27         | 6 28                | 6 28         | 6 29                 | 6 30         | 6 31         | 6 31         | 6 32         | 6 33         | 6 34           |
| 20         | 6 28         | 6 29         | 6 30                | 6 30         | 6 31                 | 6 32         | 6 33         | 6 33         | 6 34         | 6 35         | 6 36           |
| 21         | 6 30         | 6 30         | - 6 31              | 6 32         | 6 33                 | 6 34         | 6 35         | 6 35         | 6 36         | 6 37         | 6 38           |
| 22<br>23   | 6 31<br>6 33 | 6 32         | 6 33<br>6 35        | 6 34<br>6 36 | 6 35<br>6 37         | 6 36<br>6 37 | 6 37<br>6 38 | 6 37<br>6 39 | 6 38<br>6 40 | 6 39         | 6 40<br>6 42   |
| 24         | 6 84         | 6 35         | 6 35                | 6 37         | 6 38                 | 6 39         | 6 40         | 6 41         | 6 42         | 6 43         | 6 45           |
| 25         | 6 86         | 6 37         | 6 38                | 6 39         | 6 40                 | 6 41         | 6 42         | 6 43         | 6 45         | 6 46         | 6 47           |
| 26<br>27   | 6 38<br>6 39 | 6 39<br>6 40 | 6 40<br>6 42        | 6 41<br>6 43 | 6 42<br>6 44         | 6 43<br>6 45 | 6 44<br>6 46 | 6 45<br>6 48 | 6 47         | 6 48         | 6 49<br>6 51   |
| 28         | 6 41         | 6 42         | 6 43                | 6 45         | 6 46                 | 6 47         | 6 48         | 6 50         | 6 51         | 6 52         | 6 53           |
| 29         | 6 43         | 6 44         | 6 45                | 6 47.        | 6 48                 | 6 49         | 6 <b>5</b> 0 | 6 52         | 6 53         | . 6 54       | 6 56           |
| 30         | 6 45         | 6 46         | 6 47                | 6 48         | 6 50                 | 6 51         | 6 53         | 6 54         | 6 55         | 6 57         | 6 58           |
| 81<br>32   | 6 46<br>6 48 | 6 48<br>6 50 | 6 49<br>6 51        | 6 50<br>6 53 | 6 52<br>6 54         | 6 53<br>6 56 | 6 55<br>6 57 | 6 56<br>6 58 | 6 58         | 6 59         | 7 1 7 3        |
| 33         | 6 50         | 6 52         | 6 53                | 6 55         | 6 56                 | 6 58         | 6 59         | 7 1          | 7 2          | 7 4          | 7 5            |
| 34         | .6 52        | 6 54         | 6 55                | 6 57         | 6 58                 | 7 0          | 7 2          | 7 8          | 7 5          | 7 6          | 7 8            |
| 35<br>36   | 6 54<br>6 55 | 6 56<br>6 58 | 6 57<br>7 0         | 6 59<br>7 1  | 7 1 7 3              | 7 2 7 5      | 7 4          | 7 6          | 7 7          | 7 9 7 12     | 7 11 7 14      |
| 37         | 6 58         | 7 0          | 7 2                 | 7 4          | 7 5                  | 7 7          | 7 9          | 7 11         | 7 13         | 7 15         | 7 16           |
| 98         | 7 1          | 7 2          | 7 4                 | 7 6          | 7 8                  | 7 10         | 7 12         | 7 14         | 7 16         | • 7 17       | 7 19           |
| <b>8</b> 9 | 7 3          | 7 5          | 7 7                 | 7 9          | 7 10                 | 7 12         | 7 14         | 7 16         | 7 18         | 7 20         | 7 22           |
| 40         | 7 5          | 7 7          | 7 9                 | 7 11         | 7 13                 | 7 15         | 7 17         | 7 19         | 7 21         | 7 23         | 7 25           |
| 41<br>42   | 7 8 7 10     | 7 10<br>7 12 | 7 12 7 14           | 7 14         | 7 16                 | 7 18         | 7 20 7 28    | 7 22 7 25    | 7 24 7 28    | 7 27 7 30    | 7 29 7 32      |
| 48         | 7 13         | 7 15         | 7 17                | 7 19         | 7 22                 | 7 24         | 7 26         | 7 28         | 7 31         | 7 33         | 7 95           |
| 44         | 7 15         | 7 18         | 7 20                | 7 22 7 25    | 7 25                 | 7 27         | 7 29         | 7 31         | 7 34         | 7 36         | 7 29           |
| 45<br>46   | 7 18         | 7 21         | 7 23 7 26           | 7 25         | 7 28                 | 7 30         | 7 33         | 7 35         | 7 38         | 7 40         | 7 43           |
| 47         | 7 2 1        | 7 27         | 7 29                | 7 32         | 7 35                 | 7 37         | 7 40         | 7 43         | 7 46         | 7 48         | 7 51           |
| 48         | 7 27<br>7 31 | 7 50         | 7 83                | 7 35<br>7 39 | 7 38                 | 7 41         | 7 44         | 7 47         | 7 50         | 7 53         | 7 56           |
| 43         |              | 7 33         | 7 36                |              |                      | 7 45         | 7 48         | 7 51         | 7 54         | 7 57         | 8 0            |
| 50         | 7 34         | 7 37         | 7 40                | 7 48         | 7 46                 | 7 49 7 53    | 7 52<br>7 56 | 7 55<br>8 0  | 7 58         | 8 2 8 6      | 8 5<br>8 10    |
| 52         | 7 41         | 7 45         | 7 48                | 7 51         | 7 54                 | 7 58         | 8 1          | 8 5          | 8 8          | 8 12         | 8 15           |
| 53         | 7 45         | 7 49         | 7 52                | 7 56         | 7 59                 | 8 3          | 8 6          | 8 10         |              |              | 8 21           |
| 54<br>55   | 7 50         | 7 58         | 7 57                | 8 0          | 8 4 8 9              | 8 8 8 8 15   | 8 11 8 17    | 8 15<br>8 21 | 8 19<br>8 25 | 8 23<br>8 29 | 8 27<br>8 33   |
| 56         | 7 59         | 8 3          | 8 7                 | 8 11         | 8 15                 | 8 19         | 8 23         | 8 27         | 8 32         |              | 8 40           |
| 57         | 8 4          | 8 8          | 8 12                | 8 16         | 8 21                 | 8 25         | 8 29         | 8 34         |              | 8 43         | 8 48           |
| 58<br>59   | 8 9<br>8 15  | 8 14         | 8 18                | 8 22         | 8 27                 | 8 32         | 8 36<br>8 44 | 8 41 8 49    | 8 46<br>8 54 |              | 8 56<br>9 5    |
| 63         | 8 22         | 8 26         | 8 31                | 8 36         | 8 41                 | 8 47         | 8 52         | -            | ·]           |              |                |
| 1          | 1 0 72       | , 0 20       | 4 6 91              | מני קו       | . 0 31               | 1 0 47       | 1 0 52       | 1 0 30       | 1 9 3        | 1 9 9        | 1 9 19         |

TABLE XLV.

APPARENT TIME OF TRANSIT OF POLE STAR.

|          | Jan.         | Feb.         | March       | April.         | May.                 | June.        | July.        | Aug.         | Sept.        | Oct.           | Nov.         | Dec.         |
|----------|--------------|--------------|-------------|----------------|----------------------|--------------|--------------|--------------|--------------|----------------|--------------|--------------|
| Days.    | P. M.        | P. M.        | P. M.       | P. M.          | A. M.                | A. M.        | A. M.        | A.M.         | A. M.        | A. M.          | P. M.        | P. M.        |
| 1        | 6h 9/        | 3h 56'       | 2h 4/       | Oh 10          | 10h 19'              | 8h 17'       | 6h 18/       | 4h 9'        | 2h13'        | Oh 25'         | 10h 25/      | 8h 22/       |
| 2        | .6 4         | 3 52         | 2 0         | 0 7            | 10 15                | 8 13         | 6 9          | 4 5          | 2 10         | 0 21           | 10 21        | 8 18         |
| 3        | 6 0          | 3 48         | 1 57        | 0 3            | 10 12                | 8 9          | 6 .5         | 4 1          | 2 6          | 81 0           | 10 17        | 8 13         |
| 4        | 5 55         | 9 44         | 1 53        | 0 0            | 10 8                 | 8 5          | 6 1          | 3 57         | 2 3          | 0 14           | 10 13        | 8 9          |
| _        | ,            | 0.40         | 1 40        | A. M.          |                      | ١            |              | ,            |              |                |              | ن ہ          |
| 5<br>6   | 5 51<br>5 47 | 3 40<br>3 86 | 1 49        | 11 56<br>11 52 | 10 4<br>10 0         | 8 1<br>7 57  | 5 57<br>5 59 | 3 58<br>3 49 | 1 59<br>1 55 | 0 10           | 10 9         | 8 5<br>8 0   |
| 7        | 5 42         | 3 32         | 1 42        | 11 49          | 9 56                 | 7 53         | 5 49         | 3 49<br>3 45 | 1 52         | 0 8            | ro 1         | 7 56         |
| ' '      | 3 42         | 3 32         |             | 11 49          | 3 30                 | 1 33         | J 75         | 3 43         | 1 02         | S P. M.        | 10 1         | 1 30         |
|          | ł            | 1            |             |                |                      |              |              |              |              | 712 0          | 1            |              |
| 8        | 5 38         | 3 28         | 1 38        | 11 45          | 9 52                 | 7 49         | 5 44         | 3 42         | 1 48         | 11 56          | 9 57         | 7 52         |
| 9        | 5 33         | 3 24         | 1 34        | 11 41          | 9 48                 | 7 45         | 5 40         | 3 38         | 1 45         | 11 52          | 9 53         | 7 47         |
| 10       | 5 29         | 3 20         | 1 31        | 11 38          | 9 45                 | 7 41         | 5 36         | 8 34         | 1 41         | 11 48          | 9 49         | 7 43         |
| 11       | 5 25         | 3 16         | 1 27        | 11 34          | 9 41                 | 7 36         | 5 32         | 8 30         | 1 37         | 11.45          | 9 45         | 7 38         |
| 12       | 5 20         | 8 12         | 1 23        | 11 30          | 9 37                 | 7 32         | 5 28         | 3 26         | 1 34         | 11 41          | 9 41         | 7 84         |
| 13       | 5 16         | 8 8          | 1 20        | 11 27          | 9 33                 | 7 28         | 5 24         | 3 23         | 1 30         | 11 37          | 9 37         | 7 50         |
| 14       | 5 12         | 8 4          | 1 16        | 11 23          | 9 29                 | 7 24         | 5 20         | 8 19         | 1 27         | 11 34          | 9 33         | 7 25         |
| 15       | 5 7          | 8 0          | 1 12        | 11 19          | 9 25                 | 7 20         | 5 16         | 3 15         | 1 23         | 11 30          | 9 29         | 7 21         |
| 16       | 5 3          | 2 57         | 1 9         | 11 16          | 9 21                 | 7 16         | 5 12         | 3 11         | 1 19         | 11 26          | 9 25         | 7 16         |
| 17       | 4 59         | 2 58         | 1 5         | 11 12          | 9 17                 | 7 11         | 5. 8         | 3 8          | 1 16         | 11 22<br>11 19 | 9 20         | 7 12         |
| 18<br>19 | 4 55<br>4 50 | 2 50         | 1 1<br>0 58 | 11 8<br>11 4   | 9 13                 | 7 7          | 5 4<br>5 0   | 3 4<br>3 0   | 1 12         | 11 19<br>11 15 | 9 16<br>9 12 | 7 7 7 7 3    |
| 20       | 4 46         | 2 42         | 0 54        | 11 1           | 9 5                  | 6 59         | 4 56         | 2 57         | 1 5          | 11 11          | 9 8          | 6 59         |
|          |              |              |             |                |                      |              |              |              |              |                |              |              |
| 21       | 4 42         | 2 38         | 0 50        | 10 57          | 9 1                  | 6 55         | 4 52         | 2 54         | 1 1          | 11 7           | 9 4          | 6 54         |
| 22       | 4 38         | 2 34         | 0 47        | 10 53          | 8 58                 | 6 51         | 4 48         | 2 50         | 0 58         | 11 4           | 9 0          | 6 50         |
| 23       | 4 33         | 2 30         | 0 43        | 10 50          | 8 54                 | 6 47         | 4 44         | 2 46         | 0 54         | 11 0           | 8 56         | 6 45         |
| 24<br>25 | 4 29<br>4 25 | 2 27<br>2 23 | 0 40        | 10 46          | 8 <i>5</i> 0<br>8 46 | 6 42<br>6 38 | 4 40<br>4 36 | 2 48<br>2 39 | 0 51         | 10 56<br>10 52 | 8 52<br>8 48 | 6 41<br>6 36 |
| 26       | 4 21         | 2 19         | 0 36        | 10 38          | 8 42                 | 6 34         | 4 36<br>4 32 | 2 35         | 0 43         | 10 48          | 8 44         | 6 32         |
| 27       | 4 17         | 2 15         | 0 29        | 10 36          | 8 38                 | 6 30         | 4 28         | 2 32         | 0 40         | 10 44          | 8 39         | 6 <b>2</b> 7 |
| 23       | 4 13         | 2 11         | 0 25        | 10 31          | 8 34                 | 6 26         | 4 24         | 2 28         | 0 36         | 10 41          | 8 35         | 6 23         |
| 29       | 4 8          | 2 8          | 0 21        | 10 27          | 8 30                 | 6 22         | 4 20         | 2 24         | 0 33         | 10 37          | 8 31         | 6 19         |
| 30       | 4 4          |              | 0 18        | 10 23          | 8 26                 | 6. 17        | 4 16         | 2 21         | Ò 29         | 10 33          | 8 26         | 6 14         |
| 31       | 4 0          |              | 0 14        |                | 8 22                 |              | 4 12         | 2 17         |              | 10 29          |              | 6 10         |
|          |              |              |             |                |                      |              |              |              |              |                |              |              |

### TABLE XLVI.

### DIFFERENCE OF ALTITUDE OF POLE STAR AND POLE.

Argument. Distance of the Star from the Meridian, in Sidereal Time.

SUBTRACT.

Min ( O Hour | 1 Hour | 2 Hours | 3 Hours | 4 Hours | 5 Hours | 5 Hours | 1 
| Min.        | O Hour.   | 1 Hour.   | 2 Hours. | S Hours. | 4 Hours. | 5 Hours. | 1   |
|-------------|-----------|-----------|----------|----------|----------|----------|-----|
| 0           | 1° 46′.9  | 1° 43′.5  | 10 32/.6 | 10 15'.6 | 0° 59'.4 | 0° 27′.7 | 60  |
| 5           | 1 46.9    | 1 42.7    | 1 31.4   | 1 18.9   | 0 51.4   | 0 25.4   | 55  |
| 10          | 1 .8      | 1 42.0    | 1 60.2   | 1 12,2   | 0 49.4   | 0 23.2   | 50  |
| 15          | 1 46.7    | 1 41.2    | 1 28.9   | 1 10.5   | 0 47.5   | 0 20.9   | 45  |
| 20          | 1 46.5    | 1 40.4    | 1 27.6   | ¥ 8.7    | 0 45.2   | 0 18.6   | 40  |
| 25          | 1 46.3    | 1 39.6    | 1 26.2   | 1 6.9    | 0 43.1   | 0 16.3   | 35  |
| 30          | 1 46.0    | 1 58.8    | 1 94.8   | 1 5.1    | 0 40.9   | 0 14.0   | 30  |
| 85          | 1 45.7    | 1 37.9    | .1 23.4  | 1 3.2    | O 38.8   | 0 11.6   | 25  |
| 40          | 1 45.3    | 1 36.9    | 1 21.9   | 1 13     | 0 36.6   | 0 9.3    | 20  |
| 45 ·        | 1 44.9    | 1 35.9    | 1 20.4   | 0 59.4   | 0 84.4   | Q 7.0    | 15  |
| <i>5</i> 0, | 1 44.4    | 1 34.8    | 1 18.8   | 0 57.4   | 0 32.2   | 0 4.7    | -10 |
| <b>5</b> 5  | 1 48.9    | 1 98.7    | 1 17.8   | 0 55.4   | 0 29.9   | 0 2.3    | 5   |
| <b>60</b>   | 1 43.5    | 1 32.6    | 1 15.6   | 0 58.4   | 0. 27.7  | 0.0      | 0   |
|             | 11 Hours. | 10 Hours. | 9 Hours. | 8 Hours. | 7 Hours. | 6 Hours. | Min |

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TABLE XLVII.

## TO FIND THE DISTANCE OF OBJECTS AT SEA.

| In   | Height | Distance | Height  | Distance | Height | Distance  | Height | Distance   | Height | Distance         |
|--|--------|----------|---------|----------|--------|-----------|--------|------------|--------|------------------|
| 1   1.06   61   8.31   142   12.67   720   28.53   2500   53.     2   1.50   62   8.37   144   12.76   740   28.93   2600   54.     3   1.84   63   8.44   146   12.85   760   29.92   2650   54.     4   2.13   64   8.51   148   12.94   780   29.70   2700   55.     5   2.38   65   8.58   150   13.03   800   30.08   2750   55.     6   2.60   66   8.64   155   13.24   820   30.45   2800   56.     7   2.81   67   8.70   160   13.45   840   30.82   2850   56.     8   3.01   68   8.77   165   13.66   860   31.19   2900   57.     9   3.19   69   8.83   170   13.87   880   31.19   2900   57.     9   3.19   63   8.83   170   13.87   880   31.55   2930   57.     10   3.96   70   8.89   175   14.07   900   31.30   3000   58.     11   3.53   71   8.98   180   14.27   920   32.25   3050   58.     12   3.68   72   9.02   185   14.46   940   32.80   3100   59.     13   3.83   73   5.09   190   14.66   940   32.95   3100   59.     14   3.98   74   9.15   195   14.85   980   33.29   3200   60.     16   4.25   76   9.27   210   15.41   1020   38.96   39.50   61.     17   4.38   77   9.33   230   16.13   1060   34.62   3400   62.     20   4.76   80   9.51   250   16.81   1100   35.57   3500   62.     21   4.87   81   9.57   260   17.15   1120   35.59   3500   62.     21   4.87   81   9.57   260   17.15   1120   35.59   3500   63.     23   5.10   83   9.69   280   17.79   1160   36.42   3650   64.     24   5.21   84   9.75   290   8.11   1180   36.52   3650   64.     25   5.32   85   9.80   300   18.42   1200   37.45   3800   65.     31   5.92   91   10.14   360   20.18   1320   37.75   3900   66.     31   5.92   91   10.14   360   20.18   1300   38.94   4000   67.     31   5.92   91   10.14   360   20.18   1300   38.94   4000   67.     31   5.92   91   10.14   360   20.18   1300   38.94   4000   67.     31   5.92   91   10.14   360   20.18   1300   38.94   4000   67.     31   5.92   91   10.14   360   20.18   1300   38.94   4000   67.     31   5.92   91   10.14   360   20.18   1300   38.94   4000   67.     32   5.00   60.14   60 | in     | in,      | in      | in       | in     | in        | in     |            | in     | in               |
| 2  | Feet.  | SeaMiles | Feet.   | SeaMiles | reet.  | Sea Mues. | Feet.  | Sea Miles. | reet.  | Sea Miles        |
| \$\begin{array}{c c c c c c c c c c c c c c c c c c c  |        |          | 1       |          |        |           |        |            |        | 53.70            |
| 4         2.13         64         8.51         148         12.94         780         29.70         2700         55.           5         2.98         65         8.58         1.50         1.08         80         30.08         2800         56.           7         2.81         67         8.70         160         13.45         840         30.45         2800         56.           8         3.01         68         8.77         165         13.66         860         31.19         2900         57.           10         3.56         70         8.89         170         13.87         880         31.55         2950         57.           11         3.53         71         8.96         180         14.27         920         32.25         3050         58.           12         3.68         72         9.02         185         14.46         940         92.90         3100         59.           14         3.98         74         9.15         195         14.85         980         93.29         3200         60.           15         4.12         75         9.21         200         15.04         100         33.99 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>54.22</td>   |        |          |         |          |        |           |        |            |        | 54.22            |
| 5  |        |          |         |          |        |           |        |            |        | 55.25            |
| 6         2.60         66         8.64         155         13.24         820         30.45         2800         56.           7-2.81         67         8.70         160         13.45         840         30.82         2850         56.           9-3.19         69         8.83         170         13.87         880         31.55         2950         57.           10-3.96         70         8.89         175         14.07         900         31.90         3000         58.           11         3.53         71         8.96         180         14.27         920         32.25         3050         58.           12         3.68         72         9.02         185         14.46         940         32.95         31.50         59.         58.           14         3.98         74         9.15         195         14.85         960         32.95         31.50         59.         300         60.           15         4.12         75         9.27         210         15.41         1020         33.68         3230         60.           16         4.25         76         9.27         210         15.41         1020   |        |          |         |          |        |           |        |            |        | 55.76            |
| T  |        |          |         |          |        |           |        |            |        | 56.27            |
| 9   3.19   69   8.89   170   13.87   880   31.55   2950   578     11   3.53   71   8.96   180   14.27   920   31.90   3000   58.     12   3.68   72   9.02   185   14.46   940   \$2.60   \$100   59.     13   3.83   73   9.09   190   14.66   960   \$2.95   2150   59.     14   3.98   74   9.15   195   14.85   980   38.29   3200   60.     15   4.12   75   9.21   200   15.04   1000   33.63   \$3250   60.     16   4.25   76   9.27   210   15.41   1020   33.96   \$3250   61.     17   4.38   77   9.33   220   15.77   1040   34.29   3350   61.     18   4.51   78   9.39   230   16.13   1060   34.62   3400   62.     19   4.53   79   9.45   240   16.47   1080   34.95   3450   62.     20   4.76   80   9.51   250   16.81   1100   35.27   3500   62.     21   4.87   81   9.57   260   17.15   1120   35.59   3550   63.     22   4.99   82   9.63   270   17.47   1140   35.90   3600   63.     23   5.10   83   9.69   280   17.79   1160   36.22   3650   64.     24   5.21   84   9.75   290   18.11   1180   36.54   3700   64.     25   5.92   85   9.80   300   18.42   1200   56.84   3750   65.     26   5.42   86   9.86   310   18.72   1220   37.14   3800   65.     27   5.52   87   9.92   320   19.02   1240   37.45   38.50   66.     28   5.69   88   9.98   330   19.32   1260   37.75   3900   66.     30   5.82   90   10.09   350   19.89   1300   38.94   4000   67.     31   5.92   91   10.14   360   20.18   1320   38.64   4100   68.     32   6.01   92   10.20   370   20.46   1340   38.93   4200   68.     33   6.11   93   10.25   380   20.73   1360   39.92   4300   69.     34   6.20   94   10.31   390   21.00   1380   39.50   4400   70.     35   6.29   95   10.36   400   21.27   1400   39.79   4500   71.     36   6.38   96   10.42   410   21.53   1420   40.95   4000   72.     37   6.47   97   10.47   420   21.79   1440   40.95   4700   72.     38   6.69   95   10.36   400   21.27   1400   39.79   4500   71.     41   6.81   109   10.58   440   22.81   1550   41.87   5100   75.     42   6.89   10.53   400   23.78   1750   41.85   5400   74. |        |          |         |          |        |           |        |            |        | 56.77            |
| 10   9.56   70   8.69   175   14.07   900   31.90   3000   58.     11   3.53   71   8.96   180   14.27   920   32.25   3050   58.     12   5.68   72   9.02   185   14.46   940   32.25   3000   59.     13   3.83   73   9.09   190   14.66   960   32.95   3100   59.     14   3.88   74   9.15   195   14.85   980   33.29   3300   60.     15   4.12   75   9.21   200   15.04   1000   33.63   3950   60.     16   4.25   76   9.27   210   15.41   1030   33.63   3950   60.     17   4.38   77   9.33   220   15.77   1040   34.95   3350   61.     18   4.51   78   9.39   230   16.13   1060   34.62   3400   62.     19   4.53   79   9.45   240   16.47   1080   34.95   3450   62.     20   4.76   80   9.51   250   16.81   1100   35.27   3500   62.     21   4.87   81   9.57   260   17.15   1120   35.59   3550   63.     22   4.99   82   9.63   270   17.47   1140   35.90   3600   63.     23   5.10   83   9.69   280   18.11   1180   36.54   3700   64.     24   5.21   84   9.75   290   18.11   1180   36.54   3700   64.     25   5.32   85   9.86   310   18.72   1220   37.14   3800   65.     27   5.52   87   9.92   330   19.92   1240   37.45   3850   65.     28   5.62   88   9.98   330   19.92   1240   37.45   3850   65.     29   5.72   88   9.98   330   19.92   1260   37.75   3900   66.     30   5.82   90   10.09   350   19.80   1300   38.94   4000   67.     31   5.92   91   10.14   360   20.18   1320   38.64   4100   68.     33   6.11   93   10.25   380   20.73   1360   39.22   4300   69.     34   6.20   94   10.31   390   21.00   1380   39.50   4000   70.     35   6.29   95   10.47   4400   22.81   1560   43.85   4000   74.     40   6.73   100   10.63   440   22.81   1560   43.79   5000   75.     41   6.89   104   10.84   470   23.05   1400   40.63   4000   74.     42   6.89   104   10.84   470   23.05   1400   40.63   4000   74.     44   6.89   104   10.84   470   23.05   1400   40.63   4000   74.     45   7.18   110   11.15   500   23.78   1750   44.99   5000   75.     41   6.81   102   10.74   460   22.81   1560   43.79   5000   | 8      | 3.61     | 68      | 8.77     | 165    | 13.66     | 860    | 31,19      | 2900   | 57.27            |
| 11   |        |          |         |          |        |           |        |            |        | 57.76            |
| 12   | 10     | 3.36     | 70      | 8.89     | 175    | 14.07     | 900    | 31.90      | 3000   | 58.25            |
| 13   | 11     | 3.53     | 71      | 8.96     | 180    | 14.27     | 920    | 32.25      | . 3050 | 58.73            |
| 14   | 12     |          |         |          |        |           |        |            |        | 59.21            |
| 15   |        |          |         |          |        |           |        |            |        | 59.68            |
| 16   |        |          |         |          |        |           |        |            |        | 60.15            |
| 17   |        |          |         |          |        |           |        |            |        | 60.62            |
| 18   |        |          |         |          |        |           |        |            |        |                  |
| 15   |        |          |         |          |        |           |        |            |        |                  |
| 20   |        |          | II .    |          |        |           |        |            |        | 62.46            |
| 21   4.87   81   9.57   260   17.15   1120   35.59   3550   63.     22   4.99   82   9.63   270   17.47   1140   35.90   3600   63.     23   5.10   83   9.69   280   17.79   1160   36.22   3650   64.     24   5.91   84   9.75   290   18.11   1180   36.54   3760   65.     25   5.32   85   9.80   300   18.42   1200   36.84   3750   65.     26   5.42   86   9.86   310   18.72   1220   37.14   3800   65.     27   5.52   87   9.92   320   19.02   1240   37.45   3850   66.     28   5.62   88   9.98   390   19.92   1260   37.75   3900   66.     29   5.72   89   10.03   340   19.61   1280   38.05   3950   66.     30   5.82   90   10.09   350   19.88   1300   38.34   4000   67.     31   5.92   91   10.14   360   20.18   1320   38.94   4000   67.     31   5.92   91   10.14   360   20.18   1320   38.94   4000   67.     32   6.01   92   10.20   370   20.46   1340   39.93   4200   68.     33   6.11   93   10.25   380   20.73   1360   39.22   4300   69.     34   6.20   94   10.31   390   21.00   1380   39.50   4400   70.     35   6.29   95   10.36   400   21.27   1400   39.79   4500   71.     36   6.38   96   10.42   410   21.53   1420   40.67   4600   72.     37   6.47   97   10.47   420   21.79   1440   40.35   4700   72.     38   6.56   98   10.53   430   22.05   1460   40.63   4800   73.     39   6.64   99   10.58   440   22.31   1480   40.91   4900   74.     40   6.73   100   10.63   450   22.66   1500   41.19   5000   75.     41   6.81   102   10.74   460   22.81   1550   41.87   5100   75.     42   6.89   104   10.84   470   23.05   1600   42.54   5200   76.     43   6.97   106   10.95   480   23.54   1700   43.85   5400   78.     45   7.13   110   11.15   500   23.78   1750   44.49   5500   77.     44   7.05   108   11.05   490   23.54   1700   43.85   5400   78.     45   7.13   110   11.15   500   25.78   1750   44.49   5500   77.     46   7.21   112   11.25   510   24.01   1800   46.95   5900   81.     49   7.44   118   11.65   540   24.71   1950   46.96   5900   81.     50   7.59   120   11.65   550   25.16   20 |        |          |         |          |        |           |        |            |        | 62.91            |
| 22   |        |          |         |          |        |           |        |            |        |                  |
| 23   5.10   83   9.69   280   17.79   1160   36.22   3650   64.  |        |          |         |          |        |           |        |            |        |                  |
| 24         5.21         84         9.75         290         18.11         1180         36.54         3700         64.           25         5.32         85         9.80         300         18.42         1200         37.14         3800         65.           26         5.42         86         9.86         310         18.72         1220         37.14         3800         65.           28         5.62         88         9.98         330         19.92         1240         37.45         3850         65.           29         5.72         89         10.03         340         19.61         1280         38.05         3950         66.           30         5.82         90         10.09         950         19.80         1300         38.94         4000         67.           31         5.92         91         10.14         360         20.18         1320         38.64         4100         68.           32         6.01         92         10.20         370         20.46         1340         38.93         4200         69.           34         6.20         94         10.31         390         21.00         1380  |        |          |         |          |        |           |        |            |        | 64.24            |
| 25   |        |          |         |          |        |           |        |            | 3700   | 64.68            |
| 26         5.42         86         9.86         310         18.72         1220         37.14         3800         65.27         5.52         87         9.92         320         19.02         1240         37.45         3850         65.28         5.62         88         9.98         330         19.32         1260         37.75         3900         66.         30         5.82         90         10.09         350         19.80         1300         38.94         4000         67.           31         5.92         91         10.14         360         20.18         1320         38.64         4100         68.           32         6.01         92         10.20         370         20.46         1340         38.93         4200         68.           34         6.20         94         10.31         390         21.00         1380         39.22         4300         69.           34         6.20         94         10.31         390         21.00         1380         39.50         4400         70.           35         6.12         99         10.36         400         21.27         1400         39.95         4400         70.         70.  |        |          |         |          |        |           |        |            |        | 65.19            |
| 28         5.62         88         9.98         330         19.32         1260         37.75         3900         66.           29         5.72         89         10.03         340         19.61         1280         38.05         3950         66.           30         5.82         90         10.09         350         19.80         1300         38.94         4000         67.           31         5.92         91         10.14         360         20.18         1320         38.64         4100         68.           32         6.01         92         10.20         370         20.46         1340         38.93         4200         68.           34         6.20         94         10.31         390         21.00         1380         39.50         4400         70.           35         6.29         95         10.36         400         21.27         1400         39.79         4500         71.           36         6.38         96         10.42         410         21.53         1420         40.97         4600         72.           38         6.56         98         10.53         430         22.05         1460 <td>-26</td> <td>5.42</td> <td>86</td> <td>9.86</td> <td>310</td> <td></td> <td></td> <td></td> <td></td> <td>65.55</td>  | -26    | 5.42     | 86      | 9.86     | 310    |           |        |            |        | 65.55            |
| 29   | : 27   | 5.52     | 87      |          | 320    | 19.02     | 1240   | 37.45      | 3850   | 65.98            |
| SO   5.82   90   10.09   350   19.89   1300   38.94   4000   67.   |        |          | 11      |          |        |           |        |            |        | 66.41            |
| 31         5.92         91         10.14         360         20.18         1320         38.64         4100         68.32           32         6.01         92         10.20         370         20.46         1340         38.93         4200         68.33           34         6.20         94         10.31         390         20.00         1380         39.22         4300         69.35           35         6.29         95         10.36         400         21.27         1400         39.79         4500         70.35           36         6.38         96         10.42         410         21.53         1420         40.07         4600         72.33           37         6.47         97         10.47         420         21.79         1440         40.35         4700         72.33           38         6.56         98         10.53         430         22.05         1460         40.63         4800         73.34           40         6.73         100         10.63         450         22.86         1500         41.19         5000         74.49           42         6.89         104         10.84         470         23.05   |        |          |         |          |        |           |        |            |        | 66.83            |
| 32    6.01   | 30     | 5.82     | 90      | 10.09    | 350    | 19.80     | 1300   | 38.34      | 4000   | 67.26            |
| 33   |        |          |         |          |        |           |        |            |        | 68.09            |
| 34         6.20         94         10.31         390         21.00         1380         39.50         4400         70.35         6.29         95         10.36         400         21.27         1400         39.79         4500         71.36         71.36         6.38         96         10.42         410         21.53         1420         40.07         4600         72.37         72.38         6.56         98         10.53         430         22.05         1460         40.63         4800         73.39         6.64         99         10.58         440         22.31         1480         40.91         4900         74.40         6.73         100         10.63         450         22.66         1500         41.19         5000         75.50         75.  |        |          |         |          |        |           |        |            |        | 68.92            |
| 35    6.29   |        |          |         |          |        |           |        |            |        | 69.73            |
| 36         6.38         96         10.42         410         21.53         1420         40.97         4600         72.           37         6.47         97         10.47         420         21.79         1440         40.95         4700         72.           38         6.56         98         10.53         430         22.05         1460         40.63         4800         73.           39         6.64         99         10.58         440         22.31         1480         40.91         4900         74.           40         6.73         100         10.63         450         22.66         1500         41.19         5000         75.           41         6.81         102         10.74         460         22.81         1550         41.87         5100         75.           42         6.89         104         10.84         470         23.05         1600         42.54         5200         76           43         6.97         106         10.95         480         23.30         1650         43.20         5300         77.           44         7.05         108         11.05         500         23.78         17  |        |          |         |          |        |           |        |            |        | 70.54            |
| 37         6.47         97         10.47         420         21.79         1440         40.85         4700         72.           38         6.56         98         10.53         430         22.05         1460         40.63         4800         73.           39         6.64         99         10.58         440         22.31         1480         40.91         4900         74.           40         6.73         100         10.63         450         22.61         1500         41.87         5100         75.           41         6.81         102         10.74         460         22.81         1.550         41.87         5100         75.           42         6.89         104         10.84         470         23.05         1600         42.54         5200         76           43         6.97         106         10.95         480         23.30         1650         43.20         5300         77.           44         7.05         108         11.05         490         23.54         1700         43.85         5400         78.           45         7.13         110         11.15         500         23.78   |        |          |         |          |        |           |        |            |        | 72.12            |
| 38         6.56         98         10.53         430         22.05         1460         40.63         4800         73.39         6.64         99         10.58         440         22.31         1480         40.91         4900         74.40         6.73         100         10.63         450         22.66         1500         41.19         5000         75.           41         6.81         102         10.74         460         22.81         1550         41.87         5100         75.           42         6.89         104         10.84         470         23.05         1600         42.54         5200         76.           48         6.97         106         10.95         480         23.30         1650         43.20         5300         77.           44         7.05         108         11.05         490         23.54         1700         43.85         5400         78.           45         7.13         110         11.15         500         23.78         1750         44.49         5500         78.           46         7.21         112         11.25         510         24.01         1800         45.74         3700         80. <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>72.91</td>   |        |          |         |          |        |           |        |            |        | 72.91            |
| 39   |        |          |         |          |        |           |        |            |        | 73.68            |
| 41         6.81         102         10.74         460         22.81         1.550         41.87         5100         75.           42         6.89         104         10.84         470         23.05         1600         42.54         5200         76           43         6.97         106         10.95         480         23.30         1650         43.20         5300         77.           44         7.05         108         11.05         490         23.54         1700         43.85         5400         78.           45         7.13         110         11.15         500         23.78         1750         44.49         5500         78.           46         7.21         112         11.25         510         24.01         1800         45.12         5600         79.           47         7.29         114         11.35         520         24.25         1850         45.74         3700         80.           48         7.37         116         11.45         530         24.48         1900         46.35         5860         80.           49         7.44         118         11.65         540         24.71         <  | 39     | 6.64     | 99      | 10.58    | 440    |           |        |            |        | 74.44            |
| 42   | 40     | 6.73     | 100     | 10.63    | 450    | 22.66     | 1500   | 41.19      | 5000   | 75.20            |
| 42   | 41     | 6.81     | 102     | 10.74    | 460    | 22.81     | 1550   | 41.87      | 5100   | 75.95            |
| 44   |        |          |         | 10.84    |        |           |        |            |        | 76 69            |
| 45   | _      |          |         |          |        |           |        |            |        | 77.42            |
| 46   | ,      |          | 11 -    |          |        |           |        |            |        | 78.15            |
| 47   |        |          |         |          |        |           |        |            |        | 78.87            |
| 48   |        |          |         |          |        |           |        |            | 2600   | 79.58            |
| 49   |        |          |         |          |        |           |        |            |        | 80.29<br>80.99   |
| 50   |        |          |         |          |        |           |        |            |        | 81.69            |
| 51         7.59         122         11.75         560         25.16         2050         48.15         Height Distr           52         7.67         124         11.84         570         25.39         2100         48.73         in           53         7.74         126         11.94         580         25.61         2150         49.91           54         7.81         128         12.03         590         25.83         2200         49.88           55         7.89         130         12.12         600         26.05         2250         50.44         Sea Miles   |        |          |         |          |        |           |        |            |        | 82.38            |
| 52     7.67     124     11.84     570     25.39     2100     48.73     in       53     7.74     126     11.94     580     25.61     2150     49.91     Nautical or       .54     7.81     128     12.03     590     25.83     2200     49.88     or       .55     7.89     130     12.12     600     26.05     2250     50.44     Sea     Miles  |        | 7.50     | 100     | 11:75    | 560    | 95 16     | 9050   |            | Heich  | Distance         |
| 53 7.74 126 11.94 580 25.61 2150 49.31 Nautical 55 7.89 130 12.12 600 26.05 2250 50.44 Sea Miles   |        |          |         |          |        |           |        |            |        |                  |
| 54 7.81 128 12.03 590 25.83 2200 49.88 or or 55 7.89 130 12.12 600 26.05 2250 50.44 Sea Miles  |        |          |         | 11.94    |        |           |        |            |        |                  |
| 55   7.89   130   12.12   600   26.05   2250   50.44   Sea Miles   |        |          | 128     | 12.03    |        |           |        |            | 1      |                  |
| Fi +EG   7 OG    100   10 00    EGO   OG 40    OGOO   E1 OO  |        |          |         | 12.12    | 600 ·  | 26.05     | 2250   | 50.44      |        |                  |
|  | •56    | 7.96     | 132     | 12.22    | 620    | 26.48     | 2300   | 51.00      |        |                  |
|  |        |          |         |          |        |           |        |            |        | 82.92            |
|  |        |          |         |          |        |           |        |            |        | 117.28           |
|  |        |          |         |          |        |           |        |            |        | 143.64<br>165.89 |
| 7 1 10 1 10 1 10 10 10 10 10 10 10 10 10   |        | ·····    | · - · · | 1 12.00  |        | 40.11     | 2000   | 00,17      | ······ |                  |

TABLE XLVIII. TO CONVERT DEGREES, &. INTO TIME, AND CONVERSELY.

| l        | 10           | CONV       |              | rees,               |                |                    |                        |            | VERDE          |                            |                |
|----------|--------------|------------|--------------|---------------------|----------------|--------------------|------------------------|------------|----------------|----------------------------|----------------|
| D.       | Н. М.        | D.         | H. M.        | D.                  | Н. М.          | D.                 | Н. М.                  | D.         | Н. М.          | D.                         | Н. М.          |
| M.       | M. S.        | М.         | M. S.        | М.                  | M. S.          | М.                 | M. S.                  | М.         | M. \$.         | М.                         | M. S.          |
| 1 2      | 0 4          | 61         | 4 4 4 4 8    | 121<br>1 <b>2</b> 2 | 8 4<br>8 8     | 181<br>182         | 12 4<br>12 8           | 211<br>242 | 16 4<br>16 8   | 801<br>802                 | 20 4<br>20 8   |
| 3        | 0 12         | 68         | 4 12         | 123                 | 8 12           | 183                | 12 12                  | 243        | 16 12          | 303                        | 20 8           |
| 4        | 0 16         | 64         | 4 16         | 124                 | 8 16           | 184                | 12 16                  | 244        | 16 16          | 304                        | 20 16          |
| 5        | 0 20         | 65         | 4 20         | 125                 | 8 20           | 185                | 12 <b>2</b> 0<br>12 24 | 245        | 16 20          | 305                        | 20 20          |
| 6        | 0 24<br>0 28 | 66<br>67   | 4 24<br>4 28 | 126<br>127          | 8 24<br>8 28   | 186<br>187         | 12 24                  | 246<br>247 | 16 24<br>16 28 | 306<br>307                 | 20 24<br>20 28 |
| 8        | 0 32         | 68         | 4 32         | 128                 | 8 32           | 188                | 12 32                  | 248        | 16 32          | 308                        | 20 32          |
| 9<br>10  | 0 36<br>0 40 | 69<br>70   | 4 56<br>4 40 | 129                 | 8 36<br>8 40   | 189<br>190         | 12 36<br>12 40         | 249<br>250 | 16 86<br>16 40 | 509<br>510                 | 20 56<br>20 40 |
|          |              |            |              | 130                 |                |                    | 12 44                  | '          |                |                            |                |
| 11 12    | 0 44<br>0 48 | 71<br>72   | 4 44<br>4 48 | 131<br>132          | 8 44<br>8 48   | 191<br>192         | 12 44                  | 251<br>252 | 16 44<br>16 48 | 311<br>312                 | 20 44<br>20 48 |
| 13       | 0 52         | 73         | 4 52         | 133                 | 8 52           | 193                | 12 52                  | 253        | 16 52          | 313                        | 20 52          |
| 14       | 0 56         | 74         | 4 56         | 134                 | 8 56           | 194                | 12 56                  | 254        | 16 56          | 314                        | 20 56          |
| 15       | 1 0          | 75<br>76   | 5 0<br>5 4   | 135<br>136          | 9 0<br>9 4.    | 195<br>196         | 13 0<br>13 4           | 255<br>256 | 17 0<br>17 4   | 315<br>316                 | 21 0<br>21 4   |
| 17       | 1 8          | 77         | 58           | 137                 | 9 8            | 197                | 13 8                   | 257        | 17 8           | 317                        | 21 8           |
| 18       | 1 12         | 78         | 5 12         | 138                 | 9 12           | 198                | 13 12                  | 258        | 17 12          | 318                        | 21 12          |
| 19       | 1 16<br>1 20 | 79<br>80   | 5 16<br>5 20 | 159<br>140          | 9 16<br>9 20   | 199<br>200         | 13 16<br>13 20         | 259<br>260 | 17 16<br>17 20 | 319<br>320                 | 21 16<br>21 20 |
| 21       | 1 24         |            | 5 24         | 141                 | 9 24           | 201                | 13 24                  | 261        | 17 24          | 321                        | 21 24          |
| 22       | 1 28         | .82        | 5 28         | 142                 | 9 24           | 201<br>20 <b>2</b> | 13 28                  | 262        | 17 28          | 322                        | 21 28          |
| 23       | 1 32         | 83         | 5 32         | 143                 | 9 32           | 203                | 13 32                  | 263        | 17 32          | 323                        | 21 32          |
| 24       | 1 36<br>1 40 | 84<br>85   | 5 36<br>5 40 | 144<br>145          | 9 36<br>9 40   | 204<br>205         | 13 36<br>13 40         | 264<br>265 | 17 36<br>17 40 | 324<br>325                 | 21 36<br>21 40 |
| 26       | 1 44         | 86         | 5 44         | 146                 | 9 44           | 206                | 13 44                  | 266        | 17 44          | 326                        | 21 44          |
| 27       | 1 48         | 87         | 5 48         | 147                 | 9 48           | 207                | 13 48                  | 267        | 17 48          | 327                        | 21 48          |
| 28<br>29 | 1 52<br>1 56 | 88<br>89   | 5 52<br>5 56 | 148<br>149          | 9 52<br>9 56   | 208<br>209         | 13 52<br>13 56         | 268<br>269 | 17 52<br>17 56 | 328<br>329                 | 21 52<br>31 56 |
| 30       | 200          | 90         | 6 0          | 150                 | 10 0           | 210                | 14 0                   | 270        | 18 0           | <b>3</b> 29<br><b>3</b> 30 | 22 0           |
| 31.      | 2 4          | 91         | 6 4          | 151                 | 10 4           | 211                | 14 4                   | 271        | 18 4           | 331                        | 22 4           |
| 32       | 2 8          | 92         | 6 8          | 152                 | 10 8           | 212                | 14 8                   | 272        | 18 8           | 332                        | 22 8           |
| 33       | 2 12<br>2 16 | 93<br>94   | 6 12<br>6 16 | 153<br>154          | 10 12<br>10 16 | 213<br>214         | 14 12<br>14 16         | 273<br>274 | 18 12<br>18 16 | 333<br>334                 | 22 12<br>22 16 |
| 35       | 2 20         | 95         | 6 2Q         | 155                 | 10 20          | 215                | 14 20                  | 275        | 18 20          | 885                        | 22 20          |
| 36       | 2 24         | 96         | 6 24         | 156                 | 10 24          | 216                | 14 24                  | 276        | 18 24          | 336                        | 22 24          |
| 37<br>38 | 2 28<br>2 32 | 97<br>98   | 6 28<br>6 32 | 157<br>158          | 10 28<br>10 32 | 217<br>218         | 14 28<br>14 32         | 277<br>278 | 18 28<br>18 32 | 337<br>338                 | 22 28<br>22 32 |
| 39       | 2 36         | 99         | 6 36         | 159                 | 10 36          | 219                | 14 36                  | 279        | 18 36          | 339                        | 22 36          |
| 40       | 2 40         | 100        | 6 40         | 160                 | 10 40          | 220                | 14 40                  | 280        | 18 40          | 340                        | 22 40          |
| 41       | 2 44         | 101        | 6 44         | 161                 | 10 44          | 221                | 14 44                  | 281        | 18 44          | 341                        | 22 44          |
| 42<br>43 | 2 48<br>2 52 | 102        | 6 48<br>6 52 | 162<br>163          | 10 48<br>10 52 | 222<br>223         | 14 48<br>14 52         | 282<br>283 | 18 48<br>18 52 | 342<br>343                 | 22 48<br>22 52 |
| 44       | 2 56         | 104        | 6 56         | 164                 | 10 56          | 224                | 14 56                  | 284        | 18 <i>5</i> 6  | 344                        | 22 56          |
| 45       | 3 0          | 105        | 7 0          | 165                 | 11 0<br>11 4   | 225                | 15 0                   | 285        | 19 0           | 345                        | 23 0           |
| 46       | 3 4<br>3 8   | 106        | 7 4 7 8      | 166<br>167          | 11 4           | 226<br>227         | 15 4<br>15 8           | 286<br>287 | 19 4<br>19 8   | 346<br>347                 | 23 4<br>23 8   |
| 48       | 3 12         | 108        | 7 12         | 168                 | 11 12          | 228                | 15 12                  | 288        | 19 12          | 348                        | 23 12          |
| 49<br>50 | 3 16<br>3 20 | 109<br>110 | 7 16<br>7 20 | 169<br>170          | 11 16          | 229<br>230         | 15 16<br>15 20         | 289<br>290 | 19 16<br>19 20 | 349<br>3 <i>5</i> 0        | 23 16<br>23 20 |
| 51       | 3 24         | 1111       | 7 24         | 171                 | 11 24          | 231                | 15 24                  |            | 19 24          | 351                        | 23 24          |
| 52       | 3 24         | 1112       | 7 24         | 172                 | 11 24          | 231                | 15 24                  | 291        | 19 24          | 351                        | 23 24          |
| 53       | 3 32         | 113        | 7 32         | 173                 | 11 32          | 233                | 15 32                  | 293        | 19 32          | 353                        | 23 32          |
| 54<br>55 | 3 36<br>3 40 | 114        | 7 36         | 174                 | 11 36          | 234                | 15 86<br>15 40         | 294        | 19 36          | 354<br>355                 | 23 36<br>23 40 |
| 56       | 3 44         | 115        | 7 44         | 175                 | 11 40          | 235<br>236         | 15 40                  | 295<br>296 | 19 40<br>19 44 | 356                        | 23 44          |
| 57       | 3 48         | 117        | 7 48         | 177                 | 11 48          | 237                | 15 48                  | 297        | 19 48          | 357                        | 23 48          |
| 58<br>59 | 3 52<br>3 56 | 118        | 7 52         | 178<br>179          | 11 52<br>11 56 | 238<br>239         | 15 52<br>15 56         | 298<br>299 | 19 52<br>19 56 | 358<br>359                 | 23 52<br>23 56 |
| 60       |              | 120        | 8 0.         | 180                 | 112 0          | 240                | 16 0                   |            | 20 0           | 360                        | 24 0           |
|          |              |            |              |                     |                |                    |                        |            |                |                            |                |

TABLE XLIX.

FFFERENCE BETWEEN THE MERIDIAN ALTITUDE OF AN OBJECT, AND ITS ALTITUDE ONE MINUTE BEFORE, OR AFTER THE TIME OF TRANSIT.

| -   |  | gumen   | Dag   | lination  | of the  | Object   | of the   | came  | Name  | with th   | e Latit  | ude.   |   |
|---|--|---|---|---|---|--|--|---|---|---|--|--|---|
| g.  | 00   | 20  | 40  | 60  | 80  | 100  | 120  | 140   | 160   | 180   | 2 00   | 220  | 240   |
| it.   |  |   | 40  | 0-  | -8-   | 10   |  | 14-   |   |   |  |  |   |
| 00  | *//  | 56".2   | 28".1   | 18".7   | 14".0   | 11".1  | 9/.2   | 7".9  | 6".9  | 6".   | 5".4   | 4".9   | 4".4  |
| 2   | 56.2   |   | 56.1  | 28.0  | 18.6  | 13.9   | 11.1   | 9.2   | 7.8   | 6.8   | 5.9  | 5.3  | 4.8   |
| 4   | 28.1   | 56.1  | *   | 55.8  | 27.8  | 18.5   | 13.8   | 11.0  | 9.1   | 77  | 6.7  | 5.9  | 5.2   |
| 6   | 18.7   | 28.0  | 55.8  |   | 55.4  | 27.5   | 18.3   | 13.6  | 10.8  | 8.9   | 7.6  | 6.6  | 5.8   |
| 8   | 14.0   | 18.6  | 27.8  | 5 <b>5</b> ·4   | . *   | 54.9   | 27.3   | 18.1  | 13.4  | 10.7  | 8.8  | 7.5  | 6.4   |
| 0   | 11.1   | 13.9  | 18.5  | 27.6  | 54.9  |  | 54.2   | 26.9  | 17.8  | 13.2  | 10.5   | 8.6  | 7.3<br>8.4  |
| 2   | 9.2  | 11.1  | 13.8  | 18.3  | 27.3  | 54.2   | * .  | 53.4  | 26.5  | 17.5  | 13.0   | 10.3   | 9.8   |
| 4   | 7.9  | 9.2   | 11.0  | 13.6  | 18.1  | 26.9   | 59.4   | 50.5  | 52.5  | 26.0  |  | 12.7<br>16.7   | 12.4  |
| 6   | 6.9  | 7.8   | 9.1   | 10.8  | 13.4  | 17.8   | 26.5   | 52.5  | ,,,   | 51.4  | 25.4   | 24.8   | 16.4  |
| 8   | 6.0  | 6.8   | 7.7   | 8.9   | 10.7  | 13.2   | 17.5   | 26.0  | 51.4  |   | 50.3   | 24.0   |   |
| 0   | 5.4  | 5.9   | 6.7   | 7.6   | 8.8   | 10.5   | 13.0   | 17.1  | 25.4  | 50.3  | *  | 49.0   | 24.2  |
| 2   | 4.9  | 5.3   | 5.9   | 6.6   | 7.5   | 8.6  | 10.3   | 12.6  | 16.8  | 24.8  | 49.0   | #  | 47.7  |
| 4   | 4.4  | 4.8   | 5.2   | 5.8   | 6.4   | 7.3  | 8.4  | 10.0  | 12.4  | 16.3  | 24.2   | 47.7   |   |
| 6   | 4.0  | 4.3   | 4.7   | 5.2   | 5.7   | 6.3  | 7.1  | 8.2   | 9.8   | 12.1  | 15.9   | 23.5   | 46.2  |
| 8   | 8.7  | 4.0   | 4.3   | 4.6   | 5.0   | 5.5  | 6.2  | 6.9   | 8.0   | 9.5   | 11.7   | 15.4   | 22.7  |
| 0   | 3.4  | 3.6   | 3.9   | 4.2   | 4.5   | 4.9  | 5.5  | 6.0   | 6.8   | 7.8   | 9.2  | 11.3   | 14.9  |
| 2   | 3.1  | 3.3   | 8.5   | 3.8   | 4.1   | 4.4  | 4.8  | 5.2   | 5.8   | 6.6   | 7.5  | 8.9  | 10.9  |
| 4   | 2.9  | 3.1   | 3.3   | 8.5   | 3.7   | 4.0  | 4.3  | 4.6   | 5.1   | 5.6   | 6.3  | 7.3  | 8.5<br>7.0  |
| 6   | 2.7  | 2.8   | 3.0   | 3.2   | 3.4   | 9.6  | 3.8  | 4.1   | 4.5   | 4.9   | 5.4<br>4.7   | 6.1  | 6.0   |
| 8   | 2.5  | 2.6   | 2.8   | 2.9   | 3.0   | 3.2  | 3.4  | 3.6   | 4.0   | 4.3   | 7.1  | 5.2  |   |
| 0   | 2.3  | 2.4   | 2.6   | 2.7   | 2.8   | 3.0  | 3.1  | 3.1   | 3.6   | 3.8   | 4.1  | 4.5  | 5.0   |
| 2   | 2.2  | 2.3   | 2.4   | 2.5   | 2.6   | 2.7  | 2.9  | 3.0   | 3.1   | 3.5   | 3.6  | 4.0  | 4.3   |
| 4   | 2.0  | 2.1   | 2.2   | 2.3   | 2.4   | 2.5  | 2.6  | 2.7   | 2.9   | 3.1   | 8.3  | 3.5  | 3.8   |
| 6   | 1.9  | 2,0   | 2.0   | ₽.1   | 2.2   | 2.3  | 2.4  | 2.5   | 2.6   | 2.8   | 3.0  | 3.1  | 3.3   |
| 8   | 1.8  | 1.8   | 1.9   | 2.0   | 2.0   | 2.1  | 2.2  | 2.3   | 2.4   | 2.5   | 2.6  | 2.8  | 3.0   |
| 0   | 1.7  | 1.7   | 1.8   | 1.8   | 1.9   | 1.9  | 2.0  | 2.1   | 2.2   | 2.3   | 2.4  | 2.5  |   |
| 5   | 1.3  | 1.4   | 1.5   | 1.5   | 1.5   | 1.6  | 1.6  | 1.7   | 1.7   | 1.8   |  | 1.9  | 2.0   |
| 0   | 1.1  | 1.2   | 1.2   | 1.2   | 1.2   | 1.3  | 1.3  | 1.3   | 1.4   | 1.4   |  | 1.5  | 1.5   |
| 0   | 0.7  | 0.7   | 0.7   | 0.7   | 0.8   | 0.8  | 0.8  | 0.8   | 0.8   | 0.8   |  | 0.9  | 0.9   |
|   | ~ 4  | 0.41  | 0.4   | 0.4   | A 4   |  |  |   |   |   |  |  |   |
| 0   | 0.4  | 0.4   | 0.4   |   |   |  |  |   |   | 0.4   | 0.4  |  | 0.4   |
|   | At   | gumen   | . Dec   | lination  | of the  | Object   | of a co  | ntrary  | Name  | with th   | e l atit   | u <b>đe</b> .  |   |
| 0   |  |   |   |   |   |  |  |   |   |   |  |  | 24  |
| g.  | At   | gumen<br>20   | Dec 4º  | lination<br>6°  | of the  | Object<br>10°  | of a co  | ntrary<br>14°   | Name<br>16°   | with th   | e I atit   | 22°  | 24"   |
| g. t.   | 0° *//   | gumen<br>20<br>56".2  | 4° Dec  | 6°<br>18″.7   | 8°<br>14″.0   | Object<br>10°<br>11″.1   | of a co  | 14°<br>7″.9   | Name<br>16°<br>6".9   | with th   | 20°<br>5".4  | u <b>đe</b> .  | 4".4  |
| g. t. 0° 2  | Ar<br>0°<br>*//<br>56.2  | 2°<br>56″.2<br>28.2   | 28".1<br>18.7   | 6°<br>18″.7<br>14.0   | 8° 14".0  | Object<br>10°<br>11″.1<br>9.3  | of a co  | 7".9  | Name<br>16°<br>6".9<br>6.2  | with th   | e I atit   | 22°<br>4″.9  | 24"   |
| g. t.   | 0° *//   | gumen<br>20<br>56".2  | 4° Dec  | 6°<br>18″.7   | 8°<br>14″.0   | Object<br>10°<br>11″.1   | of a co  | 14°<br>7″.9   | Name<br>16°<br>6".9   | with th   | 20°<br>5".4<br>5.0   | 22°<br>4″.9<br>4.6   | 4".4  |
| 0° g. t. 0° 2   | At<br>0°<br>*//<br>56.2<br>28.1  | 2°<br>56″.2<br>28.2<br>18.7   | 28".1<br>18.7<br>14.0   | 18".7<br>14.0<br>11.2   | 14".0<br>11.2<br>9.3  | Object<br>10°<br>11″.1<br>9.3<br>8.0   | 9".2<br>7.9<br>7.0   | 7".9<br>7.0<br>6.2  | Name<br>16°<br>6".9<br>6.2<br>5.5   | 18°<br>6".0<br>5.5<br>5.0   | 5".4<br>5.0<br>4.5   | 22°<br>4″.9<br>4.6<br>4.1  | 4".4<br>4.1<br>3.8  |
| 0<br>g.<br>t.<br>0°<br>2<br>4<br>6<br>8                               | ##<br>56.2<br>28.1<br>18.7   | 20<br>56".2<br>28.2<br>18.7<br>14.0   | 28".1<br>18.7<br>14.0<br>11.2   | 18".7<br>14.0<br>11.2<br>9.3  | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2   | Object<br>10°<br>11″.1<br>9.3<br>8.0<br>6.9  | 9".2<br>7.9<br>7.0<br>6.1  | 7".9<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6   | Name<br>16°<br>6''.9<br>6.2<br>5.5<br>4.9   | with th<br>18°<br>6".0<br>5.5<br>5.0<br>4.5<br>4.2<br>3.9   | 5".4<br>5.0<br>4.5<br>4.2<br>3.9<br>3.6  | 22° 4".9 4.6 4.1 3.9 3.6 3.4   | 4".4<br>4.1<br>3.8<br>3.6<br>3.4<br>3.2   |
| 9 to 00 2 4 6 8 0 2   | 70°<br>*"<br>56.2<br>28.1<br>18.7<br>14.0<br>11.1<br>9.2   | 56".2<br>28.2<br>18.7<br>14.0<br>11.2<br>9.3<br>7.9   | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0  | 18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2   | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6  | Object 10° 11″.1 9.3 8.0 6.9 6.2 5.6 5.1   | 9".2<br>7.9<br>7.0<br>6.1<br>5.6<br>5.0<br>4.6   | 7".9<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6<br>4.3  | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9   | with th<br>18°<br>6".0<br>5.5<br>5.0<br>4.5<br>4.2<br>3.9<br>3.7  | 5".4<br>5.0<br>4.5<br>4.2<br>3.9<br>3.6<br>3.4   | 4/.9<br>4.6<br>4.1<br>3.9<br>3.6<br>3.4<br>3.2   | 4".4<br>4.1<br>3.8<br><b>3.</b> 6<br>3.4<br><b>5.</b> 2<br>3.0  |
| 0 2 4 6 8 0 2 4   | 7.9<br>At 0°<br>*"<br>56.2<br>28.1<br>18.7<br>14.0<br>11.1<br>9.2<br>7.9   | 56".2<br>28.2<br>18.7<br>14.0<br>11.2<br>9.3<br>7.9<br>6.9  | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1   | 18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.5  | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1   | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6   | 9".2<br>7.9<br>7.0<br>6.1<br>5.6<br>5.0<br>4.6<br>4.2  | 7".9<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6<br>4.3<br>3.9   | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7   | with the 18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4   | 5".4<br>5.0<br>4.5<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2  | 4".9<br>4.6<br>4.1<br>3.9<br>3.6<br>3.4<br>3.2<br>3.0  | 4".4<br>4.1<br>3.8<br>3.6<br>3.4<br>3.2<br>3.0<br>2.3   |
| 0 g. t. 00 2 4 6 8 0 2 4 6  | At 0° *// 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.9   | gument 20 56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 6.1   | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5  | 18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.5<br>5.0   | 8° 14".0 11.2 9.3 8.0 7.0 6.2 5.6 5.1 4.6   | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2   | 9".2<br>7.9<br>7.0<br>6.1<br>5.6<br>5.0<br>4.6<br>4.2  | 7".9<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6<br>4.3<br>3.9<br>3.7  | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4   | 18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2  | 5".4<br>5.0<br>4.5<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>3.0   | 22° 4'.9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.9   | 4".4<br>4.1<br>3.8<br>3.6<br>3.4<br>3.2<br>3.0<br>2.3<br>2.7  |
| 0 2 4 6 8 0 2 4   | 7.9<br>At 0°<br>*"<br>56.2<br>28.1<br>18.7<br>14.0<br>11.1<br>9.2<br>7.9   | 56".2<br>28.2<br>18.7<br>14.0<br>11.2<br>9.3<br>7.9<br>6.9  | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1   | 18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.5  | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1   | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6   | 9".2<br>7.9<br>7.0<br>6.1<br>5.6<br>5.0<br>4.6<br>4.2  | 7".9<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6<br>4.3<br>3.9   | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7   | with the 18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4   | 5".4<br>5.0<br>4.5<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2  | 4".9<br>4.6<br>4.1<br>3.9<br>3.6<br>3.4<br>3.2<br>3.0  | 4".4<br>4.1<br>3.8<br>3.6<br>3.4<br>3.2<br>3.0<br>2.3   |
| 0 g. t. 00 2 4 6 8 0 2 4 6  | At 0° *// 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.9   | gument 20 56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 6.1   | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5<br>4.9   | 18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6  | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1<br>4.6<br>4.2   | Object  10°  11".1  9.3  8.0  6.9  6.2  5.6  5.1  4.6  4.2  3.9  | 9".2<br>7.9<br>7.0<br>6.1<br>5.6<br>5.0<br>4.6<br>4.2  | 7".9<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6<br>4.3<br>3.9<br>3.7  | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4   | 18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2  | 5".4<br>5.0<br>4.5<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>3.0   | 22° 4'.9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.9   | 4".4<br>4.1<br>3.8<br>3.6<br>3.4<br>3.2<br>3.0<br>2.3<br>2.7  |
| 0° 2 4 6 8 0 2 4 6 8  | 7.9<br>6.0<br>7.9<br>7.9<br>6.0  | gument 2°  56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 6.1 5.5  | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5  | 18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.5<br>5.0   | 8° 14".0 11.2 9.3 8.0 7.0 6.2 5.6 5.1 4.6   | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2   | 9".2<br>7.9<br>7.0<br>6.1<br>5.6<br>5.0<br>4.6<br>4.2<br>3.9   | 7".9<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6<br>4.3<br>8.9<br>3.7  | Name 16° 6''.9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2  | with th  18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2 3.0   | 5".4<br>5.0<br>4.5<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>3.0<br>2.9  | 22°<br>4'.9<br>4.6<br>4.1<br>3.9<br>3.6<br>3.4<br>3.2<br>3.0<br>2.9<br>2.7                   | 4".4<br>4".4<br>4.1<br>3.8<br>3.6<br>3.4<br>3.2<br>3.0<br>2.3<br>2.7<br>2.6                                   |
| 0 2 4 6 8 0 2 4 6 8 0   | 7.9<br>6.0<br>11.1<br>9.2<br>7.9<br>6.0  | gument 2°  56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 6.1 5.5  | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5<br>4.9   | 18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6  | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1<br>4.6<br>4.2   | Object  10°  11".1  9.3  8.0  6.9  6.2  5.6  5.1  4.6  4.2  3.9  3.6   | 9".2<br>7.9<br>7.0<br>6.1<br>5.6<br>5.0<br>4.6<br>4.2<br>3.9<br>3.6  | 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.4 3.2 3.0 2.8  | Name 16° 6''.9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2  | with th  18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.6   | 5".4 5.0 4.5 4.2 3.9 3.6 3.4 3.2 3.0 2.9 2.7 2.6 2.4   | 22° 4'.9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.9 2.7 2.6 2.4 2.4                                     | 4".4<br>4".4<br>4.1<br>3.8<br>3.6<br>3.4<br>3.2<br>3.0<br>2.3<br>2.7<br>2.6                                   |
| 0 24 68 02 4 68 02 4 6  | At 0° *" 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0 5.4 4.9 4.4 4.0  | gumen<br>2°<br>56".2<br>28.2<br>18.7<br>14.0<br>11.2<br>9.3<br>7.9<br>6.1<br>5.5<br>4.9<br>4.5<br>4.1<br>3.8        | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5<br>4.9<br>4.5<br>4.5<br>4.5<br>3.8<br>3.5  | lination<br>6°<br>18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6<br>4.2<br>3.9<br>3.6<br>3.3                      | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1<br>4.6<br>4.2<br>3.9<br>3.4<br>3.2  | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 3.0   | 9".2<br>7.9<br>7.0<br>6.1<br>5.6<br>5.0<br>4.6<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>3.0<br>2.8              | 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.2 3.0 2.8 2.7  | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.5   | with th  18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.6 2.4   | 5".4<br>5.0<br>4.5<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>2.9<br>2.7<br>2.6<br>2.4<br>2.3   | 22° 4".9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.9 2.7 2.6 2.4 2.2                                     | 24°<br>4″.4<br>4.1<br>3.8<br>3.6<br>3.4<br>3.2<br>3.0<br>2.3<br>2.7<br>2.6<br>2.4<br>2.2<br>2.1               |
| 0 246802468 02468   | At 0° *// 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0 5.4 4.9 4.0 3.7   | gument 2° 56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 6.1 5.5 4.9 4.5 4.5 3.8   | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>6.1<br>5.5<br>4.9<br>4.5<br>4.2<br>3.8<br>3.5<br>3.5   | Ination 6° 18".7 14.0 11.2 9.3 8.0 7.0 6.2 5.5 5.0 4.6 4.2 3.9 3.6 3.3 3.1  | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1<br>4.6<br>4.2<br>3.9<br>3.6<br>3.2<br>2.9   | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8                                     | 9".2<br>7.9<br>7.0<br>6.1<br>5.6<br>5.0<br>4.6<br>4.2<br>3.9<br>3.6  | 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.4 3.2 3.0 2.8 2.7 2.5  | Name 16° 6''.9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.5 2.4  | with th  18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.6 2.4 2.3   | 5".4<br>5".4<br>5.0<br>4.5<br>3.9<br>3.6<br>3.4<br>3.2<br>3.9<br>2.7<br>2.6<br>2.3<br>2.2  | 22° 4".9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.7 2.6 2.4 2.4 2.2                                     | 24°<br>4".4<br>4.1<br>3.8<br>3.6<br>3.4<br>3.2<br>2.3<br>2.7<br>2.6<br>2.4<br>2.3<br>2.2<br>2.1<br>2.0        |
| 0 gt. 0 2 4 6 8 0 2 4 6 8 0 2 4 6 8 0                                 | At 0°  **/  56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0  5.4 4.9 4.4 4.0 3.7 3.4  | gument 2° 56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 6.1 5.5 4.9 4.5 4.1 3.8 3.5 3.2                                     | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5<br>4.9<br>4.5<br>4.2<br>3.8<br>3.5<br>3.0  | 18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6<br>4.2<br>3.9<br>3.6<br>3.3<br>2.9                                 | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1<br>4.6<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>2.9<br>2.7   | Object  10°  11".1 9.3 8.0 6.9 6.2 5.6 4.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.6                                   | 9".2<br>7.9<br>7.0<br>6.1<br>5.6<br>5.0<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>5.0<br>2.6<br>2.5              | 140<br>7".9<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6<br>4.3<br>3.7<br>3.4<br>3.2<br>3.0<br>2.8<br>2.7<br>2.5      | Name 16° 6'.9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.5 2.4 2.3                                     | with th  18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2 3.0  2.9 2.7 2.6 2.4 2.3 2.2  | 1 atit<br>20°<br>5".4<br>5.0<br>4.5<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>3.0<br>2.9<br>2.7<br>2.6<br>2.4<br>2.3<br>2.2<br>2.1   | ude 22°  | 24°<br>4".4<br>4.1<br>3.8<br>3.6<br>3.4<br>3.2<br>3.0<br>2.3<br>2.7<br>2.6<br>2.4<br>2.3<br>2.2<br>2.1<br>2.0 |
| 0 9 1 0 2 4 6 8 0 2 4 6 8 0 2 4 6 8 0 2                               | At 0°  *// 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0 5.4 4.9 4.4 4.0 3.7 3.4  | gument 2° 56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 6.9 6.1 5.5 4.5 4.1 3.8 3.5 3.2 3.0                                 | 28".1 18.7 14.0 11.2 9.3 8.0 7.0 6.1 5.5 4.9 4.5 4.2 3.8 3.5 3.0 2.8  | lination<br>6°<br>18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.5<br>5.0<br>4.6<br>4.2<br>3.9<br>3.6<br>3.3<br>3.1<br>2.9<br>2.7 | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1<br>4.6<br>3.9<br>3.6<br>3.4<br>3.2<br>2.9<br>2.6  | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5                             | 9".2 7.9 7.0 6.1 5.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.5 2.4   | 14° 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.4 3.2 2.8 2.7 2.5 2.4 2.3  | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.5 2.4 2.3 2.2                                 | with th  18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2 3.0  2.9 2.7 2.6 2.4 2.3 2.2 1  | 1 atit<br>20°<br>5".4<br>5.0<br>4.5<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>3.0<br>2.7<br>2.6<br>2.4<br>2.3<br>2.2<br>2.1<br>2.0   | 22° 4'.9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.9 2.7 2.6 2.4 2.2 2.1 2.0 1.9                         | 24° 4".4 4.1 3.8 3.6 3.4 5.2 3.0 2.3 2.7 2.6 2.1 2.0 1.8  |
| 0 8 1 0 2 4 6 8 0 2 4 6 8 0 2 4 6 8 0 2 4                             | At 0°  *// 56.2 28.1 18.7 14.0 9.2 7.9 6.0 5.4 4.9 4.4 4.0 3.7 3.4 3.1 2.9                                       | gument 2° 56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 6.1 5.5 4.9 4.5 3.8 3.5 3.2 5.0 2.8                                 | 28".1 18.7 14.0 11.2 9.3 8.0 7.0 6.1 5.5 4.9 4.5 4.5 3.8 3.5 3.9 2.8 2.6  | Ination   18".7   14.0   11.2   9.3   8.0   7.0   6.2   5.5   5.0   4.6   4.2   3.9   3.6   3.3   3.1   2.9   2.5                         | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1<br>4.6<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>2.9<br>2.7<br>2.6<br>2.4                             | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.5 2.3                             | 9".2 7.9 7.0 6.1 5.0 4.6 4.2 3.9 3.6 3.4 3.2 2.8 2.6 2.5 2.4 2.2   | 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.4 3.2 3.0 2.8 2.7 2.5 2.4 2.3 2.1                                    | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.5 2.4 2.3 2.2                                 | with th  18° 6".0 5.5 5.0 4.5 4.2 3.9 2.7 2.6 2.4 2.3 2.2 2.1 2.0   | 1 atities 1 atities 1 atities 20° 5".4 5.0 4.5 4.2 3.9 3.6 3.4 3.2 3.0 2.9 2.7 2.6 2.4 2.3 2.2 2.1 2.0 1.9   | 22° 4".9 4.6 4.1 3.9 3.6 3.4 5.2 3.0 2.9 2.7 2.6 2.4 2.2 2.1 2.0 1.9 1.8                     | 24° 4".4 4.1 3.8 5.6 3.4 5.2 2.7 2.6 2.4 2.3 2.1 2.0 2.0 1.8  |
| 0 246802468 024680246   | At 0°  *" 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0  5.4 4.9 4.4 4.0 3.7 3.4 3.1 2.9                                  | gument 2° 56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 5.5 4.9 4.5 4.1 3.8 3.5 3.2 5.0 2.8                                 | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5<br>4.9<br>4.5<br>4.2<br>3.8<br>3.5<br>3.0<br>2.8<br>2.5  | lination<br>6°<br>18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>6.2<br>5.5<br>4.6<br>4.2<br>3.9<br>3.6<br>3.3<br>1.2.9<br>2.7<br>2.5.4           | 14".00 11.2 9.3 8.00 7.00 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 9.2.7 2.6 2.4 2.3   | Object 10° 11".1 9.3 8.0 6.9 5.6 5.1 4.6 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5 2.3                                 | of a cc 12° 9".2 7.9 7.0 6.1 5.6 5.0 4.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5 2.4 2.2                         | 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.4 3.2 2.5 2.4 2.3 2.1 2.0  | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.5 2.4 2.3 2.0 2.9                             | with the second | 1 atitite 1 atit | 22° 4".9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.7 2.6 2.4 2.2 2.1 2.0 1.9 1.7                         | 24° 4".4 4.1 3.8 3.6 3.4 3.2 3.0 2.7 2.6 2.4 2.3 2.2 2.1 2.0 1.8 1.8  |
| 0 8 1 0 2 4 6 8 0 2 4 6 8 0 2 4 6 8 0 2 4                             | At 0°  *// 56.2 28.1 18.7 14.0 9.2 7.9 6.0 5.4 4.9 4.4 4.0 3.7 3.4 3.1 2.9                                       | gument 2° 56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 5.5 4.9 4.5 4.1 3.8 3.5 3.2 5.0 2.8                                 | 28".1 18.7 14.0 11.2 9.3 8.0 7.0 6.1 5.5 4.9 4.5 4.5 3.8 3.5 3.9 2.8 2.6  | Ination   18".7   14.0   11.2   9.3   8.0   7.0   6.2   5.5   5.0   4.6   4.2   3.9   3.6   3.3   3.1   2.9   2.5                         | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1<br>4.6<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>2.9<br>2.7<br>2.6<br>2.4                             | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.5 2.3                             | 9".2 7.9 7.0 6.1 5.0 4.6 4.2 3.9 3.6 3.4 3.2 2.8 2.6 2.5 2.4 2.2   | 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.4 3.2 3.0 2.8 2.7 2.5 2.4 2.3 2.1                                    | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.5 2.4 2.3 2.0 2.9                             | with the second | 1 atities 1 atities 1 atities 20° 5".4 5.0 4.5 4.2 3.9 3.6 3.4 3.2 3.0 2.9 2.7 2.6 2.4 2.3 2.2 2.1 2.0 1.9   | 22° 4".9 4.6 4.1 3.9 3.6 3.4 5.2 3.0 2.7 2.6 2.4 2.2 2.1 2.0 1.9 1.8                         | 24° 4".4 4.1 3.8 3.6 3.4 3.2 3.0 2.7 2.6 2.4 2.3 2.2 2.1 2.0 1.8 1.8  |
| 0 246802468 024680246   | At 0°  *" 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0  5.4 4.9 4.4 4.0 3.7 3.4 3.1 2.9                                  | gument 2° 56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 5.5 4.9 4.5 4.1 3.8 3.5 3.2 5.0 2.8                                 | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5<br>4.9<br>4.5<br>4.2<br>3.8<br>3.5<br>3.0<br>2.8<br>2.5  | lination<br>6°<br>18".7<br>14.0<br>11.2<br>9.3<br>8.0<br>6.2<br>5.5<br>4.6<br>4.2<br>3.9<br>3.6<br>3.3<br>1.2.9<br>2.7<br>2.5.4           | 14".00 11.2 9.3 8.00 7.00 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 9.2.7 2.6 2.4 2.3 2.1 2.0   | Object 10° 11".1 9.3 8.0 6.9 5.6 5.1 4.6 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5 2.3                                 | of a cc 12° 9".2 7.9 7.0 6.1 5.6 5.0 4.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5 2.4 2.2                         | 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.4 3.2 2.5 2.4 2.3 2.1 2.0  | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.5 2.4 2.3 2.0 2.9                             | with the second | 1 atitite 1 atit | 22° 4".9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.7 2.6 2.4 2.2 2.1 2.0 1.9 1.7                         | 24°  4".4 4.1 3.8 3.6 3.4 3.2 3.0 2.7 2.6  2.4 2.3 2.2 2.1 2.0 2.0 1.8 1.7 1.6  1.5                           |
| 0   84   0 24 68 0 24 68   0 24 68 0 24 68   0 2                      | At 0°  *" 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0  5.4 4.9 4.4 4.0 3.7 3.4 3.1 2.9 2.5                              | gument 2° 56".2 28.2 18.7 14.0 9.3 7.9 6.1 5.5 4.1 3.8 3.5 3.0 2.8 2.6 2.4  | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5<br>4.9<br>4.5<br>4.2<br>3.8<br>3.5<br>3.3<br>3.0<br>2.8<br>2.5<br>2.3  | lination  6°  18".7 14.0 11.2 9.3 8.0 7.0 6.2 5.5 5.0 4.6 4.2 3.9 3.6 3.3 3.1 2.9 2.7 2.5 2.4 2.2   | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1<br>4.6<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>2.9<br>2.7<br>2.6<br>2.4<br>2.3                      | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5 2.3 2.2                     | 9".2 7.9 7.0 6.1 5.6 4.2 3.9 3.6 3.4 3.2 2.8 2.6 2.5 2.4 2.2 2.1   | 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.7 3.4 3.2 3.0 2.8 2.7 2.5 2.4 2.3 2.1 2.0 1.9                                | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 5.0 2.9 2.7 2.5 2.4 2.3 2.2 2.0 1.9 1.8                     | with the second | 1 atition 1 20° 5".4 5.0 4.5 4.2 3.9 3.6 3.4 3.2 3.0 2.9 2.7 2.6 2.4 2.3 2.2 2.1 2.0 1.9 1.8 1.7 1.6 1.6   | ude 22° 4".9 4.6 4.1 3.9 3.4 5.2 3.0 2.9 2.7 2.6 2.4 2.4 2.1 2.0 1.9 1.8 1.7                 | 24° 4".4 4.1 3.8 3.6 3.4 5.2 3.0 2.3 2.7 2.6 2.1 2.0 1.8 1.8 1.7 1.6  |
| 0 246802468 0246802468 024  | At 0°  *// 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0 5.4 4.0 3.7 3.4 3.1 2.9 2.7 2.5 2.3 2.2 2.0                      | gument 2° 56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 6.9 5.5 4.9 4.5 4.1 3.8 3.5 3.0 2.8 2.6 2.4 2.2 11.9                | 28".1 18.7 14.0 11.2 9.3 8.0 7.0 6.1 5.5 4.9 4.5 4.2 3.8 3.5 3.0 2.8 2.6 2.5 2.3 2.2 2.3 1.9  | lination 6° 18".7 14.0 11.2 9.3 8.0 6.2 5.5 5.0 4.6 4.2 9.3 8.6 3.3 3.1 2.9 2.7 2.5 2.4 2.2 2.1 2.0 1.8                                   | 14".00 11.2 9.3 8.00 7.00 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 9.2.7 2.6 2.4 2.3 2.1 2.0   | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2 3.9 3.6 2.6 2.5 2.3 2.2 2.1 2.0 1.8                         | of a cc 12° 9".2 7.9 7.0 6.1 5.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5 2.4 2.2 2.1 2.0 1.9 1.8                 | ntrary 14° 7".9 7.0 6.2 5.5 5.0 4.3 3.9 3.7 3.4 3.2 2.8 2.7 2.5 2.4 2.3 2.1 2.0 1.9                         | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 8.7 8.4 3.2 2.5 2.4 2.3 2.2 2.0 1.9 1.8 1.7                             | with th  18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2 2.7 2.6 2.4 2.3 2.1 2.0 1.9 1.7 1.6 1.5   | 1 atit<br>20°<br>5".4<br>5.0<br>4.5<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>3.0<br>2.7<br>2.6<br>2.4<br>2.3<br>2.2<br>2.1<br>2.0<br>1.9<br>1.8<br>1.7<br>1.6<br>1.6<br>1.5   | 22° 4".9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.9 2.7 2.6 2.4 2.2 2.1 1.9 1.8 1.7 1.6 1.5             | 24° 4".4 4.1 3.8 3.6 3.4 5.2 3.0 2.3 2.7 2.6 2.1 2.0 2.0 1.8 1.7 1.6 1.5 1.5                                  |
| 0 246802468 0246802468 0246   | At 0°  *" 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0  5.4 4.9 4.4 3.7 3.4 3.1 2.9 2.7 2.5                              | gument 2°  56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.1 5.5 4.9 4.5 4.5 4.5 2.2 3.0 2.8 2.6 2.4                            | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5<br>4.9<br>4.5<br>3.5<br>3.5<br>3.5<br>3.0<br>2.6<br>2.5<br>2.3   | lination  6° 18".7 14.0 11.2 9.3 8.0 7.0 6.2 5.5 4.6 4.2 3.9 3.6 3.3 3.1 2.9 2.7 2.4 2.2 2.1 2.0 1.8                                      | 14".00 11.2 9.3 8.00 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 2.9 2.7 2.6 2.4 2.3 2.1 2.0 1.9 1.7  | Object 10° 11".1 9.3 8.0 6.9 5.6 5.1 4.6 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5 2.3 2.2 2.1 2.0 1.8 1.6             | of a cc 12° 9".2 7.9 7.0 6.1 5.6 5.0 4.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5 2.4 2.1 2.0 1.9 1.8 1.7         | 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.4 3.2 2.5 2.4 2.3 2.1 2.0 1.9  | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.5 2.4 2.3 2.2 2.0 1.9 1.8                     | with th  18° 6".00 5.5 5.00 4.5 3.9 3.7 3.4 3.2 3.00 2.9 2.7 2.6 2.3 2.1 2.0 1.9 1.8 1.7 1.65 1.4   | 1 atitite 1 atit | 22° 4".9 4.6 4.1 3.9 3.6 3.4 5.2 3.0 2.7 2.6 2.4 2.2 2.1 2.0 1.9 1.7 1.6 1.5 1.4             | 24° 4".4 4.1 3.8 3.6 3.4 3.2 3.0 2.7 2.6 2.4 2.3 2.2 2.1 2.0 2.0 1.8 1.7 1.6 1.5 1.5                          |
| 0 246802468 0246802468 02468  | At 0°  *" 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0  5.4 4.9 4.4 4.0 3.7 3.4 3.1 2.9 2.5 2.3 2.2 2.0 1.8              | gument 2° 56".2 28.2 18.7 14.0 9.3 7.9 6.9 5.5 4.9 4.5 4.1 3.8 3.2 5.0 2.8 2.6 2.4 2.2 11.9 1.8                     | 28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5<br>4.9<br>4.5<br>4.2<br>3.8<br>3.5<br>3.0<br>2.8<br>2.5<br>2.3<br>1.9<br>1.7                                     | lination  6° 18".7 14.0 11.2 9.3 8.0 7.0 6.2 5.5 5.0 4.6 4.2 3.9 3.6 3.3 1 2.9 2.7 2.5 2.4 2.2 2.1 2.0 1.8 1.7                            | 14".00 11.2 9.3 8.00 7.00 6.2 5.6 5.1 4.6 9.3 8.6 9.2 2.7 2.6 2.4 2.3 2.1 2.0 1.9 1.8 1.7 1.6   | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5 2.3 2.1 2.0 1.8 1.7 1.6         | of a cc 12° 9".2 7.9 7.0 6.1 5.6 5.0 4.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.5 2.4 2.2 2.1 2.0 1.9 1.8 1.7 1.6     | 14° 7"9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.4 3.2 2.5 2.4 2.3 2.1 1.9 1.8 1.7 1.6 1.5                         | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.5 2.4 2.3 2.2 2.0 1.9 1.8 1.7 1.6 1.5         | with th  18° 6".0 5.5 5.0 4.5 3.9 3.7 3.4 3.2 3.0  2.9 2.7 2.6 2.4 2.3 2.2 2.1 2.0 1.8  1.7 1.6 1.5 1.4   | 1 atities 1 atities 1 atities 20° 5".4 5.0 4.5 4.2 3.9 3.6 3.4 3.2 2.7 2.6 2.4 2.3 2.2 2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.3   | 22° 4''.9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.7 2.6 2.4 2.4 2.2 1.9 1.7 1.7 1.6 1.5 1.4 1.3        | 24° 4".4 4.1 3.8 3.6 3.4 3.2 3.0 2.7 2.6 2.4 2.3 2.2 2.1 2.0 1.8 1.7 1.6 1.5 1.5 1.5 1.3                      |
| 0   8 1   0 2 4 6 8 0 2 4 6 8   0 2 4 6 8 0 2 4 6 8 0 2 4 6 8 0       | At 0°  *" 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0  5.4 4.9 4.4 4.0 3.7 3.4 3.1 2.9 2.5 2.3 2.2 2.0 1.9 1.7          | gument 2° 56".2 28.2 18.7 14.0 9.3 7.9 6.1 5.5 4.1 3.8 3.5 3.0 2.8 2.6 2.4 2.2 2.1 1.9 1.7 1.6                      | . Dec  4º  28".1 18.7 14.0 11.2 9.3 8.0 7.0 6.1 5.5 4.9  4.5 4.2 3.8 3.5 3.3 3.0 2.8 2.6 2.5 2.3 1.9 1.8 1.7  | lination  6°  18".7  14.0  11.2  9.3  8.0  6.2  5.5  5.0  4.6  3.6  3.1  2.9  2.7  2.5  2.1  2.0  1.8  1.7  1.5                           | 14".0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.2<br>5.6<br>5.1<br>4.6<br>4.2<br>3.9<br>3.6<br>3.4<br>3.2<br>2.7<br>2.6<br>2.3<br>2.1<br>2.0<br>1.9<br>1.8<br>1.7 | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2 3.9 3.6 2.5 2.3 2.2 2.1 2.0 1.8 1.7 1.6 1.5 1.4             | of a cc 12° 9".2 7.9 7.0 6.1 5.6 4.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5 2.4 2.2 2.1 1.9 1.8 1.7 1.6 1.5 1.4 | 14° 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.4 3.2 2.5 2.4 2.3 2.10 1.9 1.8 1.7 1.6 1.5 1.4                   | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 2.7 2.5 2.4 2.3 2.2 2.0 1.9 1.8 1.8 1.7 1.6 1.5 1.4         | with th  18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2 2.7 2.6 2.4 2.3 2.2 2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.3   | e I atit    20°     5".4     5.0     4.5     4.2     3.9     2.7     2.6     2.4     2.3     2.2     1.8     1.7     1.6     1.5     1.4     1.3     1.3   | 22° 4".9 4.6 4.1 3.9 3.4 5.2 3.0 2.9 2.7 2.6 2.4 2.4 2.2 2.1 1.9 1.7 1.6 1.5 1.4 1.3         | 24° 4".4 4.1 3.8 3.6 3.4 5.2 3.0 2.7 2.6 2.4 2.3 2.2 2.1 2.00 1.8 1.8 1.7 1.6 1.5 1.4 1.3 1.3 1.3 1.2         |
| 0   9 1   0 2 4 6 8 0 2 4 6 8   0 2 4 6 8 0 2 4 6 8 0 5               | At 0°  *// 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0  5.4 4.0 3.7 3.4 4.0 3.7 2.5 2.3 2.2 2.0 1.9 1.7 1.3             | gument 2° 56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.9 5.5 4.9 4.5 4.1 3.8 3.5 3.0 2.8 2.6 2.4 2.2 1.9 1.8 1.7             | . Dec  4°  28".1 18.7 14.0 11.2 9.3 8.0 7.0 6.1 5.5 4.9 4.5 4.5 3.8 3.5 3.0 2.8 2.6 2.5 2.3 1.9 1.8 1.7 1.6   | lination 6° 18".7 14.0 11.2 9.3 8.0 6.2 5.5 5.0 4.6 4.2 9.3 8.6 3.3 3.1 2.9 2.7 2.5 2.4 2.2 2.1 2.0 1.8 1.7 1.6 1.5                       | 3.9<br>3.6<br>3.4<br>3.2<br>2.7<br>2.6<br>2.4<br>2.3<br>2.1<br>2.0<br>1.9<br>1.5<br>1.5   | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2 3.9 3.6 2.5 2.3 2.2 2.1 2.0 1.8 1.7 1.6 1.5 1.4 1.2         | of a cc 12° 9".2 7.9 7.0 6.1 5.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.5 2.4 2.2 2.1 1.9 1.6 1.7 1.6 1.5 1.4         | ntrary 14° 7".9 7.0 6.2 5.5 5.0 4.3 3.9 3.7 3.4 3.2 2.8 2.7 2.5 2.4 2.3 2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.2 | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 8.7 8.4 3.2 2.5 2.4 2.3 2.2 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.3             | with th  18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2 2.7 2.6 2.4 2.3 2.1 2.0 1.9 1.7 1.6 1.5 1.4 1.3 1.1   | 20° 5".4 5.0 4.5 4.2 3.9 3.6 3.4 3.2 3.0 2.7 2.6 2.4 2.3 2.2 2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.3 1.3   | 22° 4'.9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.9 2.7 2.6 2.4 2.2 2.1 1.9 1.6 1.5 1.4 1.4 1.3 1.2 1.1 | 24° 4".4 4.1 3.8 3.6 3.4 5.2 3.0 2.3 2.7 2.6 2.1 2.0 1.8 1.7 1.6 1.5 1.5 1.5 1.1 1.3 1.3 1.2 1.0              |
| 0   9 t   0 2 4 6 8 0 2 4 6 8   0 2 4 6 8 0 2 4 6 8   0 2 4 6 8 0 5 0 | At 0°  *" 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0  5.4 4.9 4.4 4.0 3.7 3.4 3.1 2.9 2.7 2.5  2.3 2.2 2.0 1.8 1.7 1.3 | gument 2°  56".2 28.2 18.7 14.0 11.2 9.3 7.9 6.1 5.5 4.5 4.5 4.5 3.2 3.0 2.8 2.6 2.4 2.1 1.9 1.8 1.7 1.6 1.3        | . Dec<br>4°   28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5<br>4.9<br>4.5<br>4.2<br>3.8<br>3.5<br>3.0<br>2.8<br>2.5<br>2.3<br>1.9<br>1.6<br>1.7<br>1.6<br>1.1  | lination  6° 18".7 14.0 11.2 9.3 8.0 7.0 6.2 5.5 4.6 4.2 3.9 3.6 3.3 1.1 2.9 2.7 2.5 2.4 2.2 2.1 2.0 1.8 1.7 1.6 1.5 1.3                  | 14".00 11.2 9.3 8.00 7.0 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 2.9 2.7 2.6 2.4 2.3 2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.3 1.1                                      | Object 10° 11".1 9.3 8.0 6.9 5.6 5.1 4.6 3.9 3.6 3.4 3.2 3.0 2.8 2.6 2.5 2.3 2.2 2.1 2.0 1.8 1.7 1.6 1.5 1.4 | of a cc 12° 9".2 7.9 7.0 6.16 5.0 4.6 4.2 3.6 3.4 3.2 3.0 2.8 2.5 2.4 2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.2    | 7".9 7.0 6.2 5.5 5.0 4.6 4.3 3.9 3.7 3.4 3.2 2.5 2.4 2.3 2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.2 1.0            | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 3.7 3.4 3.2 3.0 2.9 2.7 2.5 2.4 2.3 2.2 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.3 | with th  18° 6".0 5.5 5.0 4.5 3.9 3.7 3.4 3.2 3.0  2.9 2.7 2.6 2.3 2.2 2.1 1.9 1.6 1.5 1.4 1.3 1.1 1.0  | e I atit    20°     5".4     5.0     4.5     4.2     3.9     2.7     2.6     2.4     2.3     2.2     1.8     1.7     1.6     1.5     1.4     1.3     1.3   | 22° 4".9 4.6 4.1 3.9 3.4 5.2 3.0 2.9 2.7 2.6 2.4 2.4 2.2 2.1 1.9 1.7 1.6 1.5 1.4 1.3         | 24° 4".4 4.1 3.8 3.6 3.4 5.2 3.0 2.7 2.6 2.1 2.0 1.8 1.8 1.7 1.6 1.5 1.4 1.3 1.3 1.2                          |
| 0   8 1   0 2 4 6 8 0 2 4 6 8   0 2 4 6 8 0 2 4 6 8 0 5               | At 0°  *// 56.2 28.1 18.7 14.0 11.1 9.2 7.9 6.0  5.4 4.0 3.7 3.4 4.0 3.7 2.5 2.3 2.2 2.0 1.9 1.7 1.3             | gument 2°  56".2 28.2 18.7 14.0 9.3 7.9 6.1 5.5 4.1 3.8 3.5 3.2 3.0 2.8 2.6 2.4 2.2 2.1 1.9 1.6 1.3 1.7 1.6 1.3 1.7 | . Dec<br>4°<br>28".1<br>18.7<br>14.0<br>11.2<br>9.3<br>8.0<br>7.0<br>6.1<br>5.5<br>4.9<br>4.5<br>4.2<br>3.8<br>3.5<br>3.0<br>2.8<br>2.5<br>2.3<br>1.9<br>1.7<br>1.6<br>1.3<br>1.7 | lination  6° 18".7 14.0 11.2 9.3 8.0 7.0 6.2 5.5 5.0 4.6 4.2 3.9 3.6 3.3 2.9 2.7 2.5 2.4 2.2 2.1 2.0 1.8 1.7 1.6 1.5 1.3 1.1              | 14".00 11.2 9.3 8.00 7.00 6.2 5.6 5.1 4.6 4.2 3.9 3.6 3.4 3.2 9.2.7 2.6 2.4 2.3 2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.3 1.1 1.0 7.7                               | Object 10° 11".1 9.3 8.0 6.9 6.2 5.6 5.1 4.6 4.2 3.9 3.6 2.5 2.3 2.2 2.1 2.0 1.8 1.7 1.6 1.5 1.4 1.2         | of a cc 12° 9".2 7.9 7.0 6.1 5.6 4.2 3.9 3.6 3.4 3.2 3.0 2.8 2.5 2.4 2.2 2.1 1.9 1.6 1.7 1.6 1.5 1.4         | ntrary 14° 7".9 7.0 6.2 5.5 5.0 4.3 3.9 3.7 3.4 3.2 2.8 2.7 2.5 2.4 2.3 2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.2 | Name 16° 6".9 6.2 5.5 4.9 4.6 4.2 3.9 8.7 8.4 3.2 2.5 2.4 2.3 2.2 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.3             | with th  18° 6".0 5.5 5.0 4.5 4.2 3.9 3.7 3.4 3.2 2.7 2.6 2.4 2.3 2.1 2.0 1.9 1.7 1.6 1.5 1.4 1.3 1.1   | 20° 5".4 5.0 4.5 4.2 3.9 3.6 3.4 3.2 3.0 2.7 2.6 2.4 2.3 2.2 2.1 2.0 1.9 1.8 1.7 1.6 1.5 1.4 1.3 1.3   | 22° 4'.9 4.6 4.1 3.9 3.6 3.4 3.2 3.0 2.9 2.7 2.6 2.4 2.2 2.1 1.9 1.6 1.5 1.4 1.4 1.3 1.2 1.1 | 24° 4".4 4.1 3.8 3.6 3.4 5.2 3.0 2.3 2.7 2.6 2.1 2.0 1.8 1.7 1.6 1.5 1.5 1.5 1.1 1.3 1.3 1.2 1.0              |

TO REDUCE THE NUMBERS IN THE PRECEDING TABLE, TO OTHER GIVEN INTERVALS OF TIME FROM NOON.

|      |      | A     | T.  |           |      | 4h - T44 |        |              | J N  |       |         |
|------|------|-------|-----|-----------|------|----------|--------|--------------|------|-------|---------|
|      |      | Argun |     | nterval b |      |          |        |              |      |       |         |
|      | 0'   | 1′    | 2'  | 3′        | 4'   | 5′       | 6'     | 7/           | 8′   | 9'    | 10'     |
| · O" | 0.0  | 1.0   | 4.0 | 9.0       | 16.0 | 25.0     | 36.0   | 49.0         | 64.0 | 81.0  | 100.0   |
| ĭ    | 0.0  | 1.0   | 4.1 | 9.1       | 16.1 | 25.2     | 36.2   | 49.2         | 64.3 | 81.3  | 100.3   |
| 2    | 0.0  | 1.1   | 4.1 | 9.2       | 16.2 | 25.3     | 36.4   | 49.5         | 64.5 | 81.6  | 100.7   |
| 3    | 0.0  | i.i   | 4.2 | 9.3       | 16.4 | 25.5     | 36.6   | 49.7         | 64.8 | 81.9  | 101.0   |
| 4    | 0.0  | 1.1   | 4.3 | 9.4       | 16.5 | 25.7     | 36.8   | 49.9         | 65.1 | 82.2  | 101.3   |
| 5    | 0.0  | 1.2   | 4.3 | 9.5       | 16.7 | 25.8     | 37.0   | 50.2         | 65.3 | 82.5  | 101.7   |
| 6    | 0.0  | 1.2   | 4.4 | 9.6       | 16.8 | 26.0     | 37.2   | 5Q.4         | 65.6 | 82.8  | 102.0   |
| 7    |      |       |     |           |      |          |        |              |      | \$3.1 | 102.3   |
| 8    | 0.0  | 1.3   | 4.5 | 9.7       | 16.9 | 26.2     | 37.4   | 50.6         | 65.9 | 83.4  | 102.3   |
| 9    | 0.0  |       | 4.6 | 9.8       | 17.1 | 26.3     | 37.6   | 50.9         | 66.1 |       |         |
|      | 0.0  | 1.3   | 4.6 | 9.9       | 17.2 | 26.5     | 37.8   | 51.1         | 66.4 | 83.7  | 103.0   |
| 10   | 0.0  | 1.4   | 4.7 | 10.0      | 17.4 | 26.7     | 38.0   | 51.4         | 66.7 | 84.0  | 103.4   |
| 11   | 0.0  | 1.4   | 4.8 | 10.1      | 17.5 | 26.9     | 38.2   | 51.6         | 67.0 | 84.3  | 103.7   |
| 12   | ,0.0 | 1.4   | 4.8 | 10.2      | 17.6 | 27.0     | 38.4   | 51.8         | 67.2 | 84.6  | 104.0   |
| 13   | 0.0  | 1.5   | 4.9 | 10.3      | 17.8 | 27.2     | 38.6   | 52.1         | 67.5 | 84.9  | 104.4   |
| 14   | 0.1  | 1.5   | 5.0 | 10.4      | 17.9 | 27.4     | 38.8   | 52.3         | 67.8 | 85.3  | 104.7   |
| 15   | 0.1  | 1.6   | 5.1 | 10.6      | 18.1 | 27.6     | 39.0   | 52.5         | 68.1 | 85.6  | 105.1   |
| 16   | 0.1  | 1.6   | 5.1 | 10.7      | 18.2 | 27.7     | 89.3   | 52.8         | 68.3 | 85.9  | 105.4   |
| 17   | 0.1  | 1.6   | 5.2 | 10.7      |      | 27.9     |        | 53.1         | 68.6 | 86.2  | 105.7   |
| 18   |      |       |     |           | 18.3 |          | 39.5   |              |      | 86.5  | 106.1   |
| 19   | 0.1  | 1.7   | 5.3 | 10.9      | 18.5 | 28.1     | 39.7   | 53.3         | 68.9 | 86.8  | 106.4   |
| 19   | 0.1  | 1.7   | 5.4 | 11.0      | 18.6 | 28.3     | 39.9   | 53.5         | 69.2 | 00.0  | 100.4   |
| 20   | 0.1  | 1.8   | 5.4 | 11.1      | 18.8 | 28.4     | 40.1   | 53.8         | 69.4 | 87.1  | 106.8   |
| 21   | 0.1  | 1.8   | 5.5 | 11.2      | 18.9 | 28.6     | 40.3   | 54.0         | 69.7 | 87.4  | 107.1   |
| 22   | 0.1  | 1.9   | 5.6 | 11.3      | 19.1 | 28.8     | 50.5   | 54.3         | 70.0 | 87.7  | 107.5   |
| 23   | 0.1  | 1.9   | 5.7 | 11.4      | 19.2 | 29.0     | 40.7   | 54.5         | 70.3 | 88.0  | 107.8   |
| 24   | 0.2  | 2.0   | 5.8 | 11.6      | 19.4 | 29.2     | 41.0   | 54.8         | 70.6 | 88.4  | 108.2   |
| 25   | 0.2  | 2.0   | 5.8 | 11.7      | 19.5 | 29.3     | 41.2   | 55.0         | 70.8 | 88.7  | 108.5   |
| 26   | 0.2  | 2.1   | 5.9 | 11.8      | 19.7 | 29.5     | 41.4   | 55.3         | 71.1 | 89.0  | 108.9   |
| 27   | 0.2  | 2.1   | 6.0 | 11.9      | 19.8 | 29.7     | 41.6   | 55.5         | 71.4 | 89.3  | 109.2   |
| 28   | 0.2  | 2.2   | 6.1 | 12.0      | 19.9 | 29.9     | 41.8   | 55.8         | 71.7 | 89.6  | 109.6   |
| 29   | 0.2  | 2.2   | 6.2 | 12.1      | 20.1 | 30.1     | 42.0   | 56.0         | 72.0 | 89.9  | 109.9   |
|      |      |       |     |           |      |          |        |              |      |       |         |
| \$0  | 0.3  | 2.3   | 6.3 | 12.3      | 20.3 | 30.3     | 42.3   | 56.3         | 72.3 | 90.3  | 110.3   |
| 31   | 0.3  | 2.8   | 6.3 | 12.4      | 20.4 | 30.4     | 42.5   | <b>56.6</b>  | 72.5 | 90.6  | 110.6   |
| 32   | 0.3  | 2.4   | 6.4 | 12.5      | 20.5 | 30.6     | 42.7   | 56.7         | 72.8 | 90.9  | 111.0   |
| 38   | 0.3  | 2.4   | 6.5 | 12.6      | 20.7 | 30.8     | 42.9   | 57.0         | 73.1 | 91.2  | 111.3   |
| 34   | 0.3  | 2.5   | 6.6 | 12.7      | 20.8 | 31.0     | 43.1   | 57.3         | 73.4 | 91.5  | 111.7   |
| 85   | 0.3  | 2.5   | 6.7 | 12.8      | 21.0 | 31.2     | 43.3   | 57.5         | 73.7 | 91.8  | 112.0   |
| 36   | 0.4  | 2.6   | 6.8 | 13.0      | 21.2 | 31.4     | 43.6   | 57.8         | 74.0 | 92.2  | 112.4   |
| 37   | 0.4  | 2.6   | 6.9 | 13.1      | 21.3 | 31.5     | 43.8   | 58.0         | 74.3 | 92.5  | 112.7   |
| 38   | 0.4  | 2,7   | 6.9 | 13.2      | 21.5 | 31.7     | 44.0   | <b>5</b> 8.3 | 74.5 | 92.8  | 113.1   |
| 39   | 0.4  | 2.7   | 7.0 | 13.3      | 21.6 | 31.9     | 44.2   | <b>5</b> 8.5 | 74.8 | 93.1  | 113.4   |
| 40   | 0.4  | 2.8   | 7.1 | 13.4      | 21.8 | 32.1     | 44.4   | 58.8         | 75.1 | 93.4  | 113.8   |
| 41   | 0.5  | 2.8   | 7.2 | 13.6      | 21.9 | 32.3     | 44.7   | 59.0         | 75.4 | 93.8  | , 114.1 |
| 42   | 0.5  | 2.9   | 7.3 | 13.7      | 22.1 | 32.5     | 44.9   | 59.8         | 75.7 | 94.1  | 114.5   |
| 43   | 0.5  | 2.9   | 7.4 | 13.8      | 22.2 | 32.7     | 45.1   | 59.5         | 76.0 | 94.4  | 114.8   |
| 44   | 0.5  | 3.0   | 7.5 | 13.9      | 22.4 | 32.9     | 45.3   | 59.8         | 76.3 | 94.7  | 115.2   |
| 45   | 0.6  | 3.1   | 7.6 | 14.1      | 22.6 | 33.1     | 45.5   | 60.0         | 76.6 | 95.1  | 115.6   |
| 46   | 0.6  | 3.1   | 7.7 | 14.2      | 22.7 | 33.3     | 45.8   | 60.3         | 76.8 | 95.4  | 115.9   |
| 47   | 0.6  | 3.2   | 7.7 | 14.9      | 22.9 | 33.4     | 46.0   | 60.6         | 77.1 | 95.7  | 116.3   |
| 48   | 0.6  | 3.2   | 7.8 | 14.4      | 23.0 | 33.6     | 46.2   | 60.8         | 77.4 | 96.0  | 116.6   |
| 49   | 0.7  | 3.3   | 7.9 | 14.6      | 23.2 | 33.8     | 46.5   | 61.1         | 77.7 | 96.4  | 117.0   |
|      |      |       |     |           |      |          |        |              |      |       |         |
| 50   | 0.7  | 3.4   | 8.0 | 14.7      | 23.4 | 34.0     | 46.7   | 61.4         | 78.0 | 96.7  | 117.4   |
| 51   | 0.7  | 3.4   | 8.1 | 14.8      | 23.5 | 34.2     | 46.9   | 61.6         | 78.3 | 97.0  | 117.7   |
| 52   | 0.8  | 3.5   | 8.2 | 15.0      | 23.7 | 34.4     | 47.2   | 61.9         | 78.6 | 97.4  | 118.1   |
| 53   | 0.8  | . 3.5 | 8.3 | 15.1      | 23.8 | 34.6     | 47.4   | 62.1         | 78.9 | 97.7  | 118.4   |
| 54   | 0.8  | 3.6   | 8.4 | 15.2      | 24.0 | 34.8     | 47.6   | 62.4         | 79.2 | 98.0  | 118.8   |
| 55   | 0.8  | 3.7   | 8.5 | 15.8      | 24.2 | 35.0     | 47.8   | 62.7         | 79.5 | 98 3  | . 119.2 |
| 56   | 0.9  | 3.7   | 8.6 | 15.5      | 24.3 | 35.2     | 48.1   | 62.9         | 79.8 | 98.7  | 119.5   |
| 57   | 0.9  | 3,8   | 8.7 | 15.6      | 24.5 | 35.4     | 48.3   | 63.2         | 80.1 | 99.0  | 119.9   |
| 58   | 0.9  | 3,9   | 8.8 | 15.7      | 24.7 | 35.6     | 48.5   | 63.5         | 80.4 | 99.3  | 120.5   |
| 59   | 1.0  | 3.9   | 8.9 | 15.9      | 24.8 | 35.8     | 1 48 8 | 63.7         | 40.7 | 99.7  | 120.6   |
|      |      | -1    |     |           |      |          |        |              |      |       | ,       |

#### TABLE LI.

To Reduce the Longitude, Latitude, Right Ascension, Declination, Semi-diameter, and Horizontal Parallax of the Moon, as given in the Nautical Almanack, to any given Meridian, and to any given Time under that Meridian.

| And to                       | any g | IVEII | i mie    |     |            |        |        |       | . (1) |     | 77          |            |          | <del></del> | <del></del>             |
|------------------------------|-------|-------|----------|-----|------------|--------|--------|-------|-------|-----|-------------|------------|----------|-------------|-------------------------|
| Arg. Time after noon or mid. | 1/    | 2"    | 3"       | Arg | umen<br>5″ | 6"     | 7"     | on in | 1 I W | 10" | Hour<br>20" | 30" \      | 40"      | 50"         | Arg. Longitude of Ship. |
| Oh O'                        | 0"    | 0     | 0"       | 0// | 0"         | 0"     | · 0"   | 0"    | 0"    | 0"  |             | — <u>~</u> | <br>ov   |             | 00                      |
| 0 12                         | 0     | 0     | 0        | 0   | 0          | 0      | 0      | 0     | 0     | 0   | 0           | 0          | 1        | 1           | 3                       |
| 0 24                         | 0     | 0     | 0        | 0   | 0          | 0      | 0      | 0     | 0     | 0   | 1           | 1<br>1     | 1 2      | 2 2         | 6 9                     |
| 0 36<br>0 48                 | 0     | 0     | 0        | 0   | 0          | 0      | 0      | 0     | 1     | 1   | 1           | 2          | 3        | 3           | 12                      |
| 1 0                          | o     | o     | o        | o   | ō          | Ö      | 1      | 1     | 1     | 1   | 2.          | 2          | 3        | 4           | 15                      |
| 1 12                         | 0     | 0     | 0        | 0   | 0          | 1      | 1      | 1     | 1     | 1   | 2           | 3          | 4        | 5           | 18                      |
| 1 24<br>1 36                 | 0     | 0     | 0        | 0   | 1<br>1     | 1      | 1      | 1     | 1     | 1   | 3           | 9          | 5<br>5   | 6           | 21<br>24                |
| 1 48                         | o     | ŏ     | Ŏ        | 1   | î          | i      | î      | î     | ī     | i   | 3           | 4          | 6        | 7           | 27                      |
| 2 0                          | 0     | 0     | 0        | 1   | 1          | 1      | 1      | 1     | 1     | 2   | 3           | 5          | 7        | 8           | 30                      |
| 2 12<br>2 24                 | 0     | 0     | 1        | 1   | 1          | 1<br>1 | 1      | 1 2   | 2 2   | 2 2 | 4           | 5<br>6     | 7 8      | 9<br>10     | 93<br><b>36</b>         |
| 2 36                         | ő     | ŏ     | , ī      | i   | î          | î      | 2      | 2     | 2     | 2   | 4           | 6          | 9        | 11          | 39                      |
| 2 48                         | 0     | 0     | 1        | 1   | 1          | 1      | 2      | 2     | 2     | 2   | 5           | 7          | 9        | 12          | 42                      |
| 3 0<br>3 12                  | 0     | 0     | 1        | 1   | 1          | 1 2    | 2 2    | 2     | 2 2   | 3   | 5<br>5      | 7<br>8     | 10       | 12<br>13    | 45<br>48                |
| 3 24                         | o     | i     | i        | i   | 1          | 2      | 2      | 2     | 3     | 3   | 6           | 8          | 11       | 14          | 51                      |
| 3 36                         | 0     | 1     | 1        | 1   | 1          | 2      | 2      | 2     | 3     | 3   | 6           | 9          | 12       | 15          | 54                      |
| 3 48                         | 0     | 1     | 1        | 1   | 2          | 2      | 2      | 3     | 3     | 3   | 6           | 9          | 13       | 16          | 57                      |
| 4 0<br>4 12                  | 0     | 1     | 1        | 1   | 2 2        | 2      | 2      | 3     | 3     | 3   | 7           | 10         | 13<br>14 | 17<br>17    | 60<br>63                |
| 4 24                         | 0     | i     | 1        | 1   | 2          | 2 2    | 2      | 3     | 3     | 4   | 1 7         | 11         | 15       | 18          | 66                      |
| 4 36                         | 0     | i     | 1        | 2   | 2          | 2      | 3      | 3     | 3     | 4   | 8           | 11         | 15       | 19          | 69                      |
| 4 48                         | 0     | 1     | 1        | 2   | 2          | 2      | 3      | 3     | 4     | 4   | 8           | 12         | 16       | 20          | 72                      |
| 5 0<br>5 12                  | 0     | 1     | 1        | 2 2 | 2<br>2     | 3      | 3      | 3     | 4     | 4   | 8 9         | 12         | 17<br>17 | 21<br>22    | 75<br>78                |
| 5 24                         | ŏ     | lî    | î        | 2   | 2          | 3      | 3      | 4     | 4     | 4   | 9           | 13         | 18       | 22          | 81                      |
| <i>5</i> 36                  | 0     | 1     | 1        | 2   | 2          | 3      | 3      | 4     | 4     | 5   | 9           | 14         | 19       | 23          | 84                      |
| 5 48                         | 0     | 1     | 1        |     | 2          | 3      | 3      | 4     | 4     | 5   | 10          | 14         | 19       | 24          | 87                      |
| 6 0<br>6 12                  | 0     | 1     | 1 2      | 2 2 | 3          | 3      | 3 4    | 4     | 5     | 5   | 10          | 15<br>15   | 20       | 25<br>26    | 90<br>93                |
| 6 24                         | li    | î     | 2        | ż   | 3          | 3      | 4      | 4     | 5     | 5   | 111         | 16         | 21       | 27          | 96                      |
| 6 36                         | 1     | 1     | 2        | 2   | 3          | 3      | 4      | 4     | 5     | 5   | 11          | 16         | 22       | 27          | 99                      |
| 6 48<br>7 0                  | 1     | 1     | 2 2      | 2 2 | 3          | 3      | 4      | 5     | 5 5   | 6   | 11          | 17         | 23       | 28          | 102                     |
| 7 12                         | li    | i     | 2        | 2   | 3          | 4      | 4      | 5     | 5     | 6   | 12          | 18         | 24       | 30          | 108                     |
| 7 24                         | 1     | 1     | 2        | 2   | 3          | 4      | 4      | 5     | 6     | 6   | 12          | 18         | 25       | 31          | 111                     |
| 7 36                         | 1 1   | 1     | 2 2      | 3   | 3          | 4      | 4      | 5     | 6     | 6   | 13          | 19         | 25       | 32          | 114                     |
| 7 48                         | .     | 1     | <u> </u> | 3   | 3          | 4      | 5      | 5     | 6     | 6   | 13          | 19         | 26       | 32          | 117                     |
| 8 0<br>8 12                  | 1 1   | 1     | 2 2      | 3   | 3          | 4      | 5      | 5     | 6     | 7   | 13          | 20         | 27       | 33<br>34    | 120<br>123              |
| 8 24                         | 1     | 1     | 2        | 3   | 3          | 4      | 5      | 6     | 6     | 7   | 14          | 21         | 28       | 35          | 126                     |
| 8 3 <b>6</b><br>8 48         | 1     | 1     | 2 2      | 3   | 4          | 4 4    | 5      | 6     | 6     | 7   | 14          | 21<br>22   | 29<br>29 | 36          | 129<br>132              |
| 9 0                          | li    | li    | 2        | 3   | 4          | 4      | 5<br>5 | 6     | 7     | 1 7 | 15          | 22         | 30       | 37          | 135                     |
| 9 12                         | 1     | 2     | 2        | 3   | 4          | 5      | 5      | 6     | 7     | 8   | 15          | 23         | 31       | 38          | 138                     |
| 9 24                         | 1     | 2     | 2        | 3   | 4          | 5      | 5      | 6     | 7     | 8   | 16          | 23         | 31       | 39          | 141                     |
| 9 36<br>9 48                 | 1     | 2 2   | 2 2      | 3   | 4          | 5<br>5 | 6      | 6 7   | 7 7   | 8   | 16<br>16    | 24<br>24   | 32<br>33 | 40          | 144<br>147              |
| 10 0                         | 1     | 2     | 2        | 3   | 4          | 5      | 6      | 7     | 7     | 8   | 17          | 25         | 33       | 42          | 150                     |
| 10 12                        | 1     | 2     | 3        | 3   | 4          | 5      | 6      | 7     | 8     | 8   | 17          | 25         | 34       | 42          | 153                     |
| 10 24<br>10 36               | 1     | 2 2   | 8        | 3   | 4          | 5<br>5 | 6      | 7     | 8     | 9   | 17          | 26<br>26   | 35<br>35 | 43          | 156<br>159              |
| 10 48                        | 1     | 2     | 8        | 4   | 4          | 5      | 6      | 7     | 8     | 9   | 18          | 27         | 36       | 45          | 162                     |
| 11 0                         | 1     | 2     | 3        | 4   | 5          | 5      | 6      | 7     | 8     | 9   | 18          | 27         | 37       | 46          | 165                     |
| 11 12<br>11 24               | 1     | 2 2   | 3        | 4   | 5<br>5     | 6      | 6      | 8     | 8 9   | 9.  | 19          | 28<br>28   | 37<br>38 | 47          | 168<br>171              |
| 11 36                        | 1     | 2     | 3        | 4   | 5          | 6      | 7      | 8     | 9     | 10  | 19          | 29         | 39       | 48          | 174                     |
| 11 48                        | 1     | 2     | 3        | 4   | 5          | 6      | 7      | 8     | 9     | 10  | 20          | 29         | 39       | 49          | 177                     |
| 12 0                         | 1     | 2     | 3        | 4   | 5          | 6      | 7      | 8     | 9     | 10  | 20          | 30         | 40       | 50          | 180                     |

To Reduce the Longitude, Latitude, Right Ascension, Declination, Semi-diameter, and Horizontal Parallax of the Moon, as given in the Nautical Almanack, to any given Meridian, and to any given Time under that Meridian.

| and to                     | o an  | y g              | iver     | 17     | Cim      | e  | und          | er  | tha             | t M       | ler | idi      | an. |                  |     |     |            |          |          |            |            |          |            |            | `          |                            |
|----------------------------|-------|------------------|----------|--------|----------|----|--------------|-----|-----------------|-----------|-----|----------|-----|------------------|-----|-----|------------|----------|----------|------------|------------|----------|------------|------------|------------|----------------------------|
| Arg.                       | _     |                  |          |        |          | _  |              | un  | ient            |           | -   |          |     |                  | Ty  | ve  | lve        | H        | our      |            |            |          |            |            |            | Arg.                       |
| noon or mid                | . 1   | <u>'  </u>       | 2/       |        | 3′       |    | 4'           | 2   | 3'              | 61        | _   | 7'       | 8   | <b>"</b>         | 9/  |     | 10′        | 2        | 0        | 3          | 0'         | 4        | 0′         | 5          | 0          | Longitude<br>of Ship.      |
| Oh O'                      | 0     | 0",0             | 0'       | o'     | 0"       | o⁄ | 0"           | y   | 0/0             | 0"        | 0   | 0"       | o'  | <b>0</b> ′′ 0    | 0/  | ō   | 0//        | o        | 0"       | ď          | 0/         | o'       | 0"         | o          | 0"         | 00                         |
| 0 12                       | 0     | 10               |          |        | 3        | 1  | 4            |     | 5 0             |           | þ   | - 1      | 0   | 8 0              |     |     | 10         | 0        | 20       | ŋ          | 30         | 0        | 40         | 0          | 50         | 8                          |
| 0 24                       | 10    | 20               |          | 0      |          |    | - 1          |     |                 | 12        | )   |          |     | - 1              |     |     |            | 0        | 40       | 1          | 0          | 1        | 20         | 1          | 40         | 6                          |
| 0 36                       | 10    | 30               |          |        |          | ł. | 120          |     | - 1             | 18        |     |          |     |                  | 27  |     | 30         | 1        | 0        | 1          | 30         | 2        | 0          | 2          | 30         | 9                          |
| 0 48                       | 0     | 4 0<br>5 0       |          |        | 12<br>15 | •  | 16           |     | 20 0            | 24        |     | 28       |     |                  | 36  |     | 40<br>50   | 1 1      | 20<br>40 | 2 2        | 0<br>30    | 3        | 40<br>20   | 3          | 20<br>10   | 12<br>15                   |
| 1 12                       | o     | 60               |          |        |          |    | - 1          |     | - 1             | 36        |     |          |     | - 1              |     | 1   | 0          | 2        | 0        | 3          | 0          | 4        | 0          | 5          | 0          | 18                         |
| 1 24                       | 0     | 7,0              |          |        |          |    |              |     | 350             |           |     | 49       |     | 56 1             |     | •   | 10         | 2        | 20       | 3          | 30         | 4        | 40         | 5          | 50         | 21                         |
| 1 36                       | 0-    | 8 0              | 16       |        |          |    |              |     |                 |           |     | 56       |     | 4 1              | 12  | 1   | 20         | 2        | 40       | 4          | 0          | 5        | 20         | 6          | 40         | 24                         |
| 1 48                       | 0     | 9,0              | 18       | 0      | 27       | 0  | 36           | ) • | 45 0            | 54        | 1   | 3        | 1   | 12 1             | 21  | 1   | 30         | 3        | 0        | 4          | 30         | 6        | 0          | 7          | 30         | 27                         |
| 2 0                        | 0     | 100              | .20      | 0      | 30       | 0  | 40           | 5   | 50 1            | 0         | ī   | 10       | 1 : | 20 1             | 30  | 1   | 40         | 3        | 20       | 5          | 0          | 6        | 40         | 8          | 20         | 30                         |
| 2 12                       |       |                  | 22       |        |          |    |              | Ο,  | 55 1            |           | 1   | 17       |     | 28 1             |     |     | 50         | 3        | 40       |            | 30         | 7        | 20         | 9          | 10         | 33                         |
| 2 24                       |       |                  | 24       |        |          |    |              | ı   | 0 1             |           | 1   | 24       | 1 : | 36 1             |     | 2   | 0          | 4        | 0        | 6          | ` O        | 8        | 0          | 10         | 0          | 36                         |
| 2 36                       |       |                  | 26       |        |          |    | - 1          | l.  | 5 1             |           | 1   | ,        |     | 44 1             |     | 2   | 10         | 4        |          | $\epsilon$ | 30         | 8        | 40         |            | 50         | 39                         |
| 2 48<br>3 0                |       |                  | 28<br>30 |        |          |    | 56           |     | 10 1            |           | ١.  | 38       |     | 52 2             | _   |     | 20<br>30   | 4<br>  5 | 40<br>0  | 7          | 0          | 9        | 20         | 11<br>12   | 40<br>30   | 42<br>45                   |
| 3 12                       | 11 :  | 1                | 32       |        |          | -  | 0            |     | $\frac{15}{20}$ |           |     | 45<br>52 | 2   | 0 2<br>8 2       |     | ł   | 40         | 5        | 20       | 8          | 30         |          | 40         |            | 20         | 48                         |
| 3 24                       |       |                  | 34       |        |          | ī  | 8            |     | 25 1            |           |     | 59       |     | -1               | 33  | 1 - | 50         | 5        | 40       | -          | 30         |          | 20         |            | 10         | 51                         |
| 3 36                       | 0     | 18 0             | 56       | 0      | 54       | 1  | 12           |     | 30 1            |           |     |          |     | 24 2             |     |     | 0          | 6        | 0        | 9          |            | 12       |            | 15         | 0          | 54                         |
| 3 48                       | 0     | 19¦0             | 38       | 0      | 57       | 1  | 16           | 1 : | 35 1            | 54        | 2   | 13       | 2 5 | 32 2             | 51  | 3   | 10         | 6        | 20       | 9          | 30         | 12       | <b>4</b> 0 | 15         | 50         | 57                         |
| 4 0                        | 0 5   | 20 0             | 40       | ī      | 0        | ī  | 20           |     | 40 2            |           | 2   | 20       | 2 4 | 103              | 0   | 3   | 20         | 6        | 40       | 10         | 0          | 13       | 20         | 16         | 40         | 60                         |
| 4 12                       | 0 2   | 21 0             | 42       |        | 3        | -  | 24           |     | 45 2            |           |     | . 1      | _   | 18 3             |     | 4   | 30         | 7        |          |            | 30         |          |            | 17         | 30         | 63                         |
| 4 24                       |       | 22¦0             |          | 1      | 6        | 1  | 28           |     | 50 2            |           |     | 34       |     | 56 3             | 18  | 3   | 40         | 7        | 20       |            |            | 14       | 40         |            | 20         | 66                         |
| 4 36                       |       | 23 0             |          |        |          |    | 32           |     | 55 2            |           |     |          | 3   | 43               |     |     | 50         | 7        | 40       |            | 30         |          | 20         |            | 10         | 69                         |
| 4 48                       | 0 2   | _                |          |        | 12       | •  | 36           |     | 0 2             |           |     | 48       |     | 123              |     | ١.  | 0          | 8        |          | 12         |            | 16       |            | 20         | 0          | 72                         |
| 5 O<br>5 12                | 0 4   | 1-               | 50<br>52 | 1      | 15<br>18 |    | 40           |     | $\frac{5}{10}$  |           |     | 55<br>2  |     | 20 3             |     | 4   | 10<br>20   | 8        | 20<br>40 |            | 30         | 16<br>17 | 40<br>20   |            | 50<br>40   | 7 <b>5</b><br>78           |
| 5 24                       | 0     |                  |          |        | 21       | 1  | 48           |     | 152             |           |     |          | 3 3 | 28   3<br>36   4 | _   | ı   | 30         | 9        |          |            | 30         |          |            | 22         | 30         | 81                         |
| 5 36                       | 0 2   |                  |          |        | 24       |    | 52           |     | 20 2            |           |     |          |     |                  | 12  | 1 - | 40         | 9        | 20       |            | -          |          | 40         |            | 20         | 84                         |
| 5 48                       | 0.5   | 29 0             | 58       | 1      | 27       |    | 56           |     | 25 2            |           |     |          |     |                  | 21  |     | 50         | 9        | 40       | 14         | 30         |          | 20         |            | 10         | 87                         |
| 6 0                        | 0 5   | 30 I             | 0        | 1      | 30       | 2  |              | 2 : | 30 3            |           | 3   | 30,      | 4   | 0 4              | 30  | 5   | 0          | 10       | 0        | 15         | 0          | 20       |            | 25         | 0          | 90                         |
| 6 12                       | 0 5   | 31 1             | 2        | -      |          | 2  |              |     | 35 3            |           |     | !        | 4   |                  | 39  | 5   | -          |          | 20       |            | - 1        | 20       |            | 25         | 50         | 93                         |
| 6 24                       | 0 5   |                  | 4        | _      | 36       | -  | 8            | 2 4 | 40¦3            | 12        | 3   | 44       | 4 ] | 164              | 48  | 5   | 20         |          | 40       |            | 0          | 21       | 20         |            | 40         | 96                         |
| 6 36                       | 1 -   | 33 1             | 6        | l _    | 39       | 1  | 12           |     | 45 3            |           |     | 51       |     | 24 4             |     | 5   | 30         |          |          | 16         | <b>3</b> 0 |          |            | 27         | 30         | 99                         |
| 6 48<br>7 0                | l     | 34   1<br>35   1 | 8        |        | 42       |    | - 1          |     | 50 3            |           |     | 58       |     |                  |     | 5   | 40         |          | 20       |            |            |          | 40         |            | 20         | 102                        |
| 7 12                       | 0 3   | - 1-             | 10<br>12 |        | 45<br>48 |    | 20 :<br>24 : |     | 55 3<br>0 3     |           | 4   | - 1      | 4 4 | 40 5<br>48 5     |     | 5   | 50         | 12       | 40       | 18         | 30         | 23<br>24 | 20         | 30         | 10         | 105<br>108                 |
| 7 24                       | I     | 37 1             | 14       |        | 51       |    | 28           |     | 53              |           |     | 19       |     | 56 5             |     | 1   | 10         |          | 20       |            | 30         |          | 40         |            | 50         | 111                        |
| 7 36                       | 0 8   | 38 1             | 16       |        |          |    | 32           |     |                 | 48        |     | 26       |     | 45               |     |     | 20         |          | 40       |            |            |          | 20         |            | 40         | 114                        |
| 7 48                       | 0 8   | 39 1             | 18       | 1      | 57       | 2  | 36           | 3   | 15 3            | 54        | 4   | 33       | 5 1 | 12 5             | 51  | 6   | 30         | 13       | 0        | 19         | 30         | 26       | 0          | 32         | 30         | 117                        |
| 8 0                        | 0 4   | 10 i             | 20       | 2      | 0        | 2  | 40           | 3 9 | 20 4            |           | 4   | 40       | 5 9 | 20 6             | 0   | 6   | 40         | 13       | 20       | 20         |            | 26       | 40         | 33         | 20         | 120                        |
| 8 12                       | 0 4   | - 1-             |          | 2      |          |    | 44           |     | 25 4            |           | 4   | 1        |     | 28 6             | _   | 6   | 50         |          | 40       |            | 30         |          | 20         |            | 10         | 123                        |
| 8 24                       | 1.    | 12 1             |          | 2      | 6        |    | 48           |     | 30 4            |           |     | 54       |     | 36 6             |     | 7   |            | 14       | 1        | 21         |            | 28       | -          | 35         | 0          | 126                        |
| 8 36                       |       | 13   1<br>14   1 |          | 2      |          |    | 52           |     | 35 4            |           | 5   | 1        |     | 14 6             |     | 7   |            |          | 20       |            |            | 28       |            |            | 50         | 129                        |
| 8 48 <sup>7</sup> 9<br>9 0 |       | 15 1             | 28<br>30 |        | 12<br>15 |    | 56           |     | 40 4<br>45 4    |           |     | 8        |     | 52 6             |     | 7   |            | 14       | 40       | 22<br>22   | - 1        | 29       |            | 36<br>37   | 40<br>30   | 13 <b>2</b><br>13 <b>5</b> |
| 9 12                       | I     | 16               | 1        | 2      | 18       | 3  | 0            |     | 1               | 36        | 5   | 15<br>22 | 6   | 0 6<br>8 6       |     | 7   | 30<br>40   | 15       | 20       |            | 30         |          | 0<br>40    |            | 20         | 138                        |
| 9 24                       | 0 4   | 17 1             | 34       |        |          | 3  | 8            |     |                 | 42        | 5   | 29       |     | 16.7             | 3   | 7   | 50         |          | 40       |            |            | 31       | 20         |            | 10         | 141                        |
| 9 36                       |       | 18               | 36       |        | 24       |    | 12           | ł   | 0 4             |           |     | 36       |     | 24 7             | 12  | 8   | 0          | 16       | 0        | 24         | O,         | 32       | 0          | 40         | 0          | 144                        |
| 9 48                       | 0 4   | 19 1             | 38       | 2      | 27       | 3  | 16           | 1   | 5 4             | 54        | 5   | 43       | 6 5 | 32¦7             | 21  | 8   | 10         | 16       | 20       | 24         | 30         | 32       | <b>4</b> 0 | <b>4</b> 0 | <i>5</i> 0 | 147                        |
| 10 0                       |       | 50 I             | 40       | 2      | 30       | 3  | 20           | 1   | 10,5            | 0         | 5   | 50       | 6 4 | 10 7             | 30  | 8   | 20         | 16       | 40       | 25         | 0          | 33       | 20         | 41         | 40         | 150                        |
| 10 12                      | 0 8   | 51 1             | 42       | 2      | 33       | 3  | 24           | 1   | 15'5            | 6         | 5   | 57       | 6 4 | 18 7             | 39  | 8   | 30         | 17       | o        | 25         | 30         | 34       | o'         | 42         | 30         | 153                        |
| 10 24                      | 10 5  | 52 1             | 44       | 2      | 36       | :3 | 28           | 1 : | 20.5            | 12        | 6   | 4        | 6 3 | 56:7             | 48  | 8   | 40         | 17       | 20       | 26         | O'         | 94       | 40         | 43         | 20         | 156                        |
| 10 36<br>10 48             | ءُ ما | 3 1              | 46       | 2      | 39       | 3  | 32           | : : | 25.5            | 18        | 6   | 11       | 7   | 4.7              | 57  | 8   | 50         | 17       | 40       | 26         | 30         |          | 20         | 44         |            | 159                        |
| 10 48                      | 6     | 55               | 48<br>50 | 2<br>9 | 42       | 3  | 40           | t : | 30 5<br>3 5 5   | 24        | 6   | 18       | 7 4 | 20 0             | 1 5 | 9   | C          | 18       | 90       | 27<br>97   | , o        | 36       | 40         | 45         | 50         | 162<br>165                 |
| 11 12                      | 0 8   | 6 1              | 52       | 2      | 48       | 3  | 44           |     | 10 5            | 36        | 6   | 32       | 7 9 | 28 8             | 24  | 9   | 20         | 18       | 40       | 28         | 0          | 30<br>37 | 20         | 46         | 40         | 168                        |
| 11 24                      | 0 5   | 7 1              | 54       | 2      | 51       | 3  | 48.4         | 1 4 | 45 5            | 42        | 6   | 39       | 7 5 | 36 8             | 33  | 9   | 30         | 19       | ol       | 28         | 30         | 38       | -          | 47         | - 1        | 171                        |
| 11 36                      | Ю 5   | 8 1              | 56       | 2      | 54       | 3  | 52.4         | ŧ į | 50  <i>5</i>    | 48        | 6   | 46       | 7 4 | <b>14</b> ¦8     | 42  | 9   | 40         | 19       | 20       | 29         | O          | 38       | 40         | 48         | 20         | 174                        |
| 11 48                      | О 5   | 9 1              | 58       | 2      | 57       | 3  | 56           | ł   | 55 5            | <b>54</b> | 6   | 53       | 7 ! | 52 8             | 51  | 9   | <b>5</b> C | 19       | 40       | 29         | 30         | 39       | 20,        | 49         | 10         | 177                        |
| 12 0                       | 1     | 0 2              | 0        | 8      | 0        | 4  | 0            | )   | 0 6             | Q,        | 7   | C        | 8   | 0 9              | 0   | 10  | ) C        | 20       | 0        | 30         | 0          | 40       | O'         | 50         | 0          | 180                        |

#### TABLE LI.

To Reduce the Longitude, Latitude, Right Ascension, Declination, Semi-diameter, and Horizontal Parallax of the Moon, as given in the Nautical Almanack, to any given Meridian, and to any given Time under that Meridian.

| and t          | o any        | giv   | en T         | ime   |              |    | tha      |          |   |      |           |      |          |      |           |     |                      |          |          |              |          |
|----------------|--------------|-------|--------------|-------|--------------|----|----------|----------|---|------|-----------|------|----------|------|-----------|-----|----------------------|----------|----------|--------------|----------|
| Arg.           | 10           | ·     | 00           | -     | Arg          | um |          | <u> </u> |   | atio |           | T    |          | re I | Iou       | rs. |                      |          |          | ~            | Arg.     |
| no n or mid.   |              | _ _   | 2º           | - -   | 30           | _  | 40       | _ _      | 5°  | _]_  | 6°        | _ _  | 70       | _ _  | 80        | _   | 9°                   |          |          | .0°          | of ship. |
| Oμ 0/          |              | 00    |              | /  O° | 000          |    |          |          |   |      |           |      |          |      |           |     |                      |          | -        | 0'0'         |          |
| 0 12<br>0 24   |              | 00    |              | 1.    | 3 0<br>6 0   |    |          |          |   |      |           |      |          |      | 8<br>16   |     | 0 9<br>0 18          | 0        |          | 10 0<br>20 0 | 1 -      |
| 0 36           | O 3          | 00    | 6 (          | o'o   | 9 0          | 0  | 12       | o¦o      | 15  | OO   | 18        | 00   | 21       | 00   | 24        | 0   | 0 27                 |          |          | <b>30</b> 0  | 9        |
| 0 48           | , ,          | 0.0   |              |       | 12 0         |    |          |          |   |      |           |      |          |      |           |     | 0 36                 | - 1      |          | 40 0         |          |
| 1 0<br>1 12    |              |       |              |       | 15 0<br>18 0 |    |          |          |   |      |           |      |          |      |           |     | 0 45<br>0 54         |          | 0        | 50 0<br>0 0  | !        |
| 1 24           | 0 7          | 0'0   | 14 (         | 0     | 21 0         | 0  | 28       | 00       | 35  | 00   | 42        | 00   | 49       | o¦o  |           |     | _                    | 0        |          | 10 0         | 21       |
| 1 36           |              |       |              |       | 24 0         |    |          |          |   |      |           |      |          |      | 4         |     | 1 12                 |          |          | 20 0         |          |
| 1 48           |              |       |              | _     | 27 0         | _  |          | _!—      |   | - -  | 54<br>— — | 0,1  | 3        | 01   | 12        | 0   | 1 21                 | 0        | 1        | 30 0         | 27       |
| 2 0            |              |       |              |       | 30 0         |    |          |          |   |      |           |      |          |      | 20        |     | 1 30                 |          |          | 40 0         | 1        |
| 2 12<br>2 24   | 0 12         | 00    | 24 (         | 00    | 33 0<br>36 0 | 6  | 48<br>48 | 01       |   |      |           |      |          |      | 28<br>36  |     | 1 39<br>1 48         |          | 1 2      | <i>5</i> 0 0 |          |
| 2 36           |              |       |              |       | 39 0         |    |          |          |   |      |           |      |          |      | 44        |     | 1 57                 |          | _        | 10 0         | 1        |
| 2 48           |              |       |              |       | 42 0         |    |          |          |   |      |           |      |          |      |           |     | 2 6                  | 0        |          | 20 0         |          |
| 3 0<br>3 12    |              |       |              |       | 45 0<br>48 0 |    |          |          |   |      | 30<br>36  |      |          | 02   | 8         | •   | 2 15<br>2 <b>24</b>  |          |          | 30 0<br>40 0 |          |
| 3 24           | 0 17         |       |              |       |              |    |          |          |   |      |           |      |          |      | 16        |     | 2 33                 | - 1      |          | 50 0         | 1 1      |
| 3 36           |              |       |              |       | 54 0         |    |          |          |   |      |           |      |          |      | 24        |     | 2 42                 | - 1      | 3        | 0 0          |          |
| 3 48           |              | '     |              | -!    | <i>57</i> 0  | -  |          | -!       |   | -1-  |           | _!-  |          | -!-  |           | }   | 2 51                 | <u>U</u> |          | 10 0         |          |
| 4 0            | 0 20         |       |              |       | 0 0          |    |          |          |   |      |           | - 1  |          | - 1  | 40        | - 1 |                      | 0        |          | 20 0         | i I      |
| 4 12<br>4 24   | 0 21<br>0 22 |       |              |       | 3 O          |    |          |          |   |      |           |      |          |      | 48<br>56  |     | 39<br>318            | 0        |          | 30 0<br>40 0 | 1 1      |
| 4 36           | 0 23         | o¦o   | 46 (         | 1     | 90           | 1  | 32       | 0 1      |   |      | 18        |      |          |      | 4         |     | 3 27                 |          |          | 50 O         | 69       |
| 4 48           | 0 24         |       |              |       |              |    |          |          |   |      |           |      |          |      | 12        |     | 3 36                 |          | 4        | 0 0          |          |
| 5 0<br>5 12    | 0 25         |       |              |       | 15 0<br>18 0 |    |          |          |   |      |           |      |          |      | 20<br>28  |     | 3 <b>45</b><br>3 54  |          |          | 10 0<br>20 0 |          |
| 5 24           |              |       |              |       | 21 0         |    |          |          |   |      |           |      |          | 03   |           | - 1 |                      | o        |          | 30 0         |          |
| 5 36           | 0 23         | 0,0   | <i>5</i> 6 ( | ) 1   | 24 0         | 1  | 52       | 02       | 20  | 02   | 48        | 0.3  | 16       | ols  | 44        | 0   | 4 12                 |          |          | 40 0         |          |
| 5 48           | 0 29         | 00    |              | - ;   | 27 0         | _  | 56       | 0 2      | 25  | 0 2  | 54        | 03   | 23       | 03   | 52        | 0   | 4 21                 | 0        | 4        | <i>5</i> 0 0 | 87       |
| 6 0            | 0 30         |       |              |       | 30 0         |    |          |          | 30  |      |           |      | 30       |      | 0         | - 1 | 4 30                 |          | 5        | 0 0          |          |
| 6 12<br>6 24   | 0 31         |       | 4 (          |       | 36 0<br>36 0 |    |          |          | 35<br>40                                      |      |           |      | 37<br>44 |      | 8<br>16   |     | 4 39<br>4 <b>4</b> 8 |          |          | 10 0<br>20 0 |          |
| 6 36           | 0 33         | 1     |              |       | 39 O         |    |          |          |   |      |           |      |          |      |           |     | 4 57                 |          |          | 30 0         | 1        |
| 6 48           | 0 34         | - 1 - | 8 (          |       | 42 0         |    |          |          |   |      |           |      |          |      |           |     | 5 6                  |          | <u>د</u> | 40 0         |          |
| 7 0<br>7 12    | 0 35         |       |              |       | 45 0<br>48 0 |    |          |          |   |      |           |      |          |      | 40<br>48  |     | 5 15<br>5 24         |          | 6        | <i>5</i> 0 0 | 1        |
| 7 24           | 0 37         | . 1   |              |       | 51 0         |    |          |          |   |      |           |      |          |      | 56        |     | 5 <b>3</b> 3         |          |          | 10 0         | l        |
| 7 36           | 0 38         |       |              |       |              |    |          |          |   |      |           |      |          |      |           |     | 5 42                 |          |          | 20 0         |          |
| 7 48           | 0 39         | 01    | 18 (         |       | <i>57</i> 0  | 2  | 36<br>   | 03       | 15  | 03   | 54        | 04   | 33       | 0 5  | 12        | 0   | 5 51                 | 0.       | 6        | <b>30 0</b>  | 117      |
| 8 0            | 0 40         |       |              | 1     | 0 0          |    |          |          |   |      |           |      |          |      | 20        |     |                      | 0        |          | 40 0         |          |
| 8 12<br>8 24   | 0 41         | - 1 - | 22 (         | 02    |              |    |          |          |   |      |           |      |          |      | 28<br>36  |     | 69<br>618            | 0        | 6        | <i>5</i> 0 0 |          |
| 8 36           | 0 43         | 0 1   | 26 (         | 32    | 9 0          | 2  | 52       | 03       | 35  | 0 4  | 18        | 0 5  |          |      |           |     | 6 27                 |          | ı _      | 10 4         | 129      |
| 8 48           |              |       |              |       | 12 0         | 2  | 56       | 03       | 40  | 04   | 24        | 0 5  | 8        | 0 5  | <b>52</b> | 0   | 6 36                 | 0        | 7        | <b>2</b> 0 t |          |
| 9 0<br>9 12    |              |       |              |       | 15 0<br>18 0 |    |          |          |   |      | 30<br>36  |      |          |      | 0<br>8    |     | 6 45<br>6 54         |          |          | 30 C         |          |
| 9 24           | 0 47         | 01    | 34 (         | )2    | 21 0         | 3  | 8        | 0.3      | 55  | 04   | 42        | 05   | 29       | 06   | 16        | 0   |                      | Ö        | •        | 50 C         | 1        |
| 9 36           | 0 48         | 0 1   | 36 (         | 2     | 24 0         | 3  | 12       | 0 4      | .0  | 04   | 48        | 0 5  | 36       | 06   | 24        | 0   | 7 12                 | 0        | 8        | -0 C         | 144      |
| 9 48           | 0 49         | '_    |              | - !   |              | 1_ |          | _!_      |   | _  _ |           | _ !_ |          | _!_  | 32        |     | 7 21                 |          | 8        | 10 0         |          |
| 10 0           | 0 50         | 0,1   | 40 (         | 02    | 30 0         | 3  | 20       | 0 4      | 10  | 0 5  | 0         | 0 5  | 50       | 06   | 40        | 0   | 7 30                 | 0        |          | 20 0         |          |
| 10 12<br>10 24 | 0 51<br>0 52 | 0,1   | 44 (         | 12    | 33 0<br>36 0 | 3. | 24<br>90 | 04       | 15<br>90                                      | 05   | 6<br>10   | 05   | 57<br>1  | 0,6  | 48<br>56  | 0   | 7 39<br>7 48         |          |          | 30 (<br>40 ( |          |
| 10 36          | O 53         | 0 1   | 46 (         | 0 2   | 39 0         | 3  | 32       | 04       | •25   | 05   | 18        | 0.6  | 11       | 0.7  | 4         | 0   | 7 57                 |          |          | 50 0         | 159      |
| 10 48          | 0 54         | 01    | 46 (         | 0 2   | 42 0         | 3  | 36       | 04       | 30  | 0 5  | 24        | 0,6  | 18       | 07   | 12        | 0   | 8 6                  | 0        | 9        | O C          | 162      |
| 11 0<br>11 12  | O 55<br>O 56 | 01    | 50 (<br>50 ( | 72    | 45 0<br>48 0 | 3  | 40<br>44 | 04       | 35  | 05   | 30        | 06   | 25       | 07   | 20        | 0   | 8 15<br>8 24         |          |          | 10 0         |          |
| 11 24          | 0 57         | 0 1   | 54 (         | ) 2   | <b>51</b> 0  | 13 | 48       | 04       | 45  | 0.5  | 42        | 0'6  | 39       | 0 7  | 36        | 0   | 8 33                 | 0        |          | 30 0         | 171      |
| 11 36          | 0 58         | 0 1   | <i>5</i> 6 ( | 0 3   | 54 O         | 13 | 52       | 04       | 50  | 0 5  | 48        | 0,6  | 46       | 07   | 44        | 0   | 8 42                 | 0        | 9        | <b>4</b> 0 0 | 174      |
| 11 48<br>12 0  | 0 59<br>1 0  | 01    | 58 C         | 2     | 57 C         | 3  | 56       | 04       | 55  | 05   | 54        | 0 6  | 53       | 07   | 52        | 0   | 8 51                 | 0        | 9        | 50 C         |          |
|                | A ()         | 913   | . ()         | 1,    | 0.0          | 17 | - 0      | UD       | <u>, , , , , , , , , , , , , , , , , , , </u> | Olo  | <u> </u>  | 017  | U        | υlg  | U         | U   | 9 0                  |          | 110      | - 0 0        | 1        |

TABLE LII.

EQUATION OF SECOND DIFFERENCE.

|              | <del></del> |     |           |                 | EQU        |             |             |            | ECOI     |                 | JIFF.    | EKEI     | TCE.       |      |            |            |                 |
|--------------|-------------|-----|-----------|-----------------|------------|-------------|-------------|------------|----------|-----------------|----------|----------|------------|------|------------|------------|-----------------|
| Arg.         | 1"1         | 2// | 3"        | Argu            | umen       | t. S        | econd       | Diff       | erenc    | e of            | the      | Moor     | 25"        | ice. | 4.3/       | \$ 50°     | Arg.            |
| noen or mid. |             | '   |           | ·               |            |             |             |            |          |                 |          | ا        | -          |      |            |            | noon o m.d.     |
| 0 to         | 0           | 0"  | 0"        | 0"              | 0"         | 0"          | 0"          | 0"         | 0"       | 0"              | 0"       | 0"       | 0"         | 0    | 0"<br>0/   | 0"         | 12" 0'<br>11 50 |
| 0 10         | 0           | 0   | ő         | ŏ               | ő          | 0           | ŏ           | ő          | ő        | ŏ               | ŏ        | ő        | ŏ          | ŏ    | ő          | i          | 11 40           |
| 0 50         | 0           | 0   | 0         | 0               | 0          | 0           | 0           | 0          | 0        | 0               | 0        | 0        | 0          | 1    | 1          | 1          | 11 30           |
| 0 40         | 0           | 0   | 0         | 0               | 0          | 0           | 0           | 0          | 0        | 0               | 0        | 0        | 1          | 1    | 1          | 1 2        | 11 20           |
| 0 50         | 0           | 0   | 0         | 0               | 0          | 0           | 0           | 0          | 0        | 0               | 0        | 1 1      | 1 1        | 1    | 1          | 2          | 11 10<br>11 0   |
| 1 0          | 0           | 0   | ŏ         | 0               | ő          | ő           | ő           | ő          | ŏ        | ŏ               | î        | i i      | î          | î    | 2          | 2          | 10 50           |
| 1 20         | 0           | 0   | 0         | 0               | 0          | 0           | 0           | 0          | 0        | 0               | 1        | 1        | 1          | 1    | 2          | 2          | 10 40           |
| 1 30         | 0           | 0   | 0         | 0               | 0          | 0           | 0           | 0          | 0        | 1               | 1        | 1        | 1          | 2    | 2          | 3          | 10 30           |
| 1 40         | 0           | 0   | 0         | 0               | 0          | 0           | 0           | 0          | 1        | 1               | 1        | 1        | 1          | 2    | 2          | 3          | 10 20           |
| 2 0          | 0           | 0   | 0         | 0               | 0          | 0           | 0           | 0          | 1        | 1               | 1        | 1        | 2 2        | 2    | 3          | 3          | 10 10<br>10 0   |
| 2 10         | 0           | ŏ   | o         | ŏ               | ŏ          | ŏ           | ŏ           | î          | i        | i               | li       | î        | 2          | 2    | 3          | 4          | 9 50            |
| 2 20         | 0           | 0   | 0         | 0               | 0          | 0           | 1           | 1          | 1        | 1               | 1        | 2        | 2          | 2    | 3          | 4          | 9 40            |
| 2 50         | 0           | 0   | 0         | 0               | 0          | 0           | 1           | 1          | 1        | 1               | 1        | 2 2      | 2 2        | 2    | 3          | 4          | 9 30<br>9 20    |
| 2 40         | 0           | 0   | 0         | ŏ               | ő          | Ö           | i           | 1 1        | i        | 1               | l i      | 2        | 2          | 3    | 4          | 4          | 9 10            |
| 3 0          | 0           | o   | ŏ         | 0               | 0          | 1           | 1           | 1          | 1        | 1               | 1        | 2        | 2          | 3    | 4          | 5          | 9 0             |
| \$ 10        | 0           | 0   | 0         | 0               | 0          | 1           | 1           | 1          | 1        | 1               | 1        | 2        | 2          | 3    | 4          | 5          | 8 50            |
| 3 20<br>3 30 | 0           | 0   | 0         | 0               | 0          | 1           | 1           | 1          | 1<br>1   | 1               | 1 2      | 2 2      | 3          | 3    | 4          | 5<br>5     | 8 40<br>8 30    |
| 3 40         | 0           | o   | 0         | ŏ               | i          | î           | i           | 1          | 1        | 1               | 2        | 2        | 3          | 3    | 4          | 5          | 8 20            |
| 3 50         | 0           | 0   | 0         | 0               | 1          | 1           | 1           | 1          | 1        | 1               | 2        | 2        | 3          | 3    | 4          | 5          | 8 10            |
| 4 0          | 0           | 0   | 0         | 0               | 1          | 1           | 1           | 1          | 1        | 1               | 2        | 2        | 3          | 3    | 4          | 6          | 8 0<br>7 40     |
| 4 20         | 0           | 0   | 0         | 0               | 1          | 1           | I           | 1 1        | 1        | 1               | 2 2      | 2        | 3<br>3     | 3    | 5          | 6          | 7 20            |
| 5 0          | ŏ           | ŏ   | o         | ĭ               | 1          | î           | i           | i          | î        | î               | 2        | 2        | 3          | 4    | 5          | 6          | 7 0.            |
| 5 30         | 0           | 0   | 0         | 1               | 1          | 1           | 1           | 1          | 1        | 1               | 2        | 2        | 3          | 4    | 5          | 6          | 6 30            |
| 6 0          | 0 1         | 0   | 0         | 1 1             | 1 '        | 1           | <u>' 1</u>  | 1          | 1        | 1               | 2        | 2        | 3          | 4    | 5          | 6          | 160             |
| Arg.         | <u> </u>    | 1 6 | 2/        | Arg             | gumer<br>4 |             | Secon<br>5/ | d Di<br>6' | tterer   |                 | the      | Moor     | 1's PI:    |      | 1/ 1       | 12'        | Arg.            |
| noon or mid. | 0           | _!  | 0/1       | <del>''</del> ن | -          | <u>~</u> ]- | 0           | 0"         | <u> </u> | <del>,</del>  - | 0"       | 0/1      | 0          | -    | o -        | <u>''</u>  | 12h O           |
| 0 10         | ŏ           |     | 1         | 1               |            | 2           | 2           | 2          | 9        |                 | 3        | 4        | 4          |      | 4          | 5          | 11 50           |
| 0 20         | 1           |     | 2         | 2               |            | 3           | 4           | 5          | 6        |                 | 6        | 7        | 8          | ١.   | 9          | 10         | 11 40           |
| 0 30         | 1 2         |     | 2   3     | 4<br>5          | 1 8        | 5           | 8           | 7<br>9     | 11       |                 | 10       | 11<br>14 | 12<br>16   |      | 3          | 14<br>19   | 11 30           |
| 0 40         | 2           |     | 3         | 6               |            |             | 10          | 12         | 14       |                 | 15       | 17       | 19         |      | i          | 23         | 11 10           |
| 1 0          | 2           |     | 4         | 7               |            |             | 11          | 14         | 16       | :   :           | 18       | 21       | 23         |      | 25         | 27         | 11 0            |
| 1 10         | 3           |     | 5         | 8               | 10         |             | 13          | 16         | 18       |                 | 21       | 24       | 26         |      | 29         | 32         | 10 50           |
| 1 20         | 3           |     | 6         | 9.              | 19         |             | 15          | 18<br>20   | 21 23    |                 | 24<br>26 | 27<br>29 | 30<br>33   |      | 33  <br>36 | 36<br>39   | 10 40           |
| 1 40         | 4           | -!  | -<br>7- - | 11              | 14         | - -         | 18          | 21         | 25       | -               | 29       | 32       | 36         | -    | 9 -        | 43         | 10 20           |
| 1 50         | 4           | 1   | 8         | 12              | 15         | 5           | 19          | 23         | 27       | ٠   ١           | 31       | 35       | 39         | 4    | 13         | 47         | 10 10           |
| 2 0          | 4           |     | 8         | 12              | 17         |             | 21          | 25         | 29       | , ,             | 33       | 37       | 42         | 1    | 6          | 50<br>50   | 10 0            |
| 2 10<br>2 20 | 5           |     | 9         | 13<br>14        | 18         |             | 22<br>23    | 27<br>28   | 51<br>53 | •               | 35       | 40<br>42 | 44         |      | 9          | 53<br>56   | 9 50<br>9 40    |
| 2 30         | 5           | 10  |           | 15              | 20         |             | 25          | 30         | 35       |                 | 10       | 45       | 49         |      | 4          | <i>5</i> 9 | 9 30            |
| 2 40         | 5           | 10  |           | 16              | 21         |             | 26          | 31         | 36       |                 | 11       | 47       | 52         |      | 7          | 62         | 9 20            |
| 2 50<br>3 0  | 5<br>6      | 1   |           | 16<br>17        | 22         | - 1         | 27<br>28    | 32<br>34   | 38<br>39 |                 | 13       | 49<br>51 | 54<br>56   |      | 9          | 65<br>67   | 9 10<br>9 0     |
| 3 10         | 6           | 1   | - 1       | 17              | 23         | - 1         | 29          | 35         | 41       |                 | 17       | 52       | <i>5</i> 8 |      | 4          | 70         | 8 <i>5</i> 0    |
| 3 20         | 6           | 1:  |           | 18              | 24         |             | 30          | 36         | 42       |                 | 18       | 54       | 60         |      | 6          | 72         | 8 40            |
| 3 30         | 6           | 15  |           | 19              | 25         |             | 31          | 37         | 43       |                 | 50       | 56<br>57 | 62         | 1    | 8          | 74         | 8 30            |
| 3 40<br>3 50 | 6<br>6      | 15  |           | 19<br>20        | 25         |             | 32  <br>33  | 38<br>39   | 45<br>46 |                 | 2        | 57<br>59 | 64         |      | 2          | 76<br>78   | 8 20<br>8 10    |
| 4 0          | 7           | 115 |           | 20              | 27         |             | 33          | 40         | 47       |                 | 13       | 60       | 67         |      | 3          | 80         | 8 0             |
| 4 20         | 7           | 14  |           | 21              | 28         |             | 35          | 41         | 48       |                 | 55       | 62       | 69         |      | 6          | 83         | 7 40            |
| 4 40<br>5 0  | 7<br>7      | 14  |           | 21<br>22        | 28<br>29   |             | 36<br>36    | 43<br>44   | 50<br>51 |                 | 8        | 64<br>66 | 71<br>73   | 8    | 8          | 86<br>87   | 7 20<br>7 0     |
|              |             |     |           |                 |            |             | 37          | 45         | 52       |                 | 30       | 67       | 74         |      | 2          | 89         | 6 30            |
| 5 30         | 7           | 15  | <b>)</b>  | 22              | . 30       | , , .       | ,, ,        | 70         | 32       | ١ ٧             | , ,      | ٠. ١     | 12         | 1 0  | ~ ,        | 09 1       | 0 30            |

# ALTITUDE TO BE OBSERVED, IN ORDER TO ASCERTAIN THE APPARENT TIME WITH THE GREATEST ACCURACY.

| Arg.             |                |                | Aı             | gumen                          | . Dec                        | lination                | of the               | Sun or                        | Star.          |                       |                         |                |
|------------------|----------------|----------------|----------------|--------------------------------|------------------------------|-------------------------|----------------------|-------------------------------|----------------|-----------------------|-------------------------|----------------|
| Lat.             | 20             | 40             | 6°             | 80                             | 100                          | 120                     | 140                  | 16°                           | 18°            | 200                   | 220                     | 240            |
| 00               | 0° 0′          | 00 0/          | 00 0           | 0° 0′                          | 0° 0′                        | 00 0                    | 0° 0′                | 00 0'                         | 0° 0′          | 00 0                  | 00 0                    | 0° 0'          |
| 1<br>2           | 30 1<br>90 0   | 14 29<br>30 1  | 9 37           | 7 12<br>14 31                  | 5 46<br>11 36                | 9 40                    | 8 18                 | 3 38                          | 6 29           | 2 55<br>5 52          | 2 40<br>5 21            | 2 28<br>4 55   |
| 3                | 41 49          | 48 37          | <b>5</b> 0 3   | 22 5                           | 17 32                        | 14 35                   | 12 30                | 10 57                         | 9 45           | 8 48                  | 8 2                     | 7 24           |
| 4<br>5           | 30 1<br>23 36  | 90 0<br>53 10  | 41 52<br>56 30 | 30 <i>5</i> 38 46              | 23 41<br>30 8                | 19 36<br>24 47          | 16 45<br>21 7        | 14 40<br>18 26                | 13 3<br>16 23  | 11 46                 | 10 44<br>13 27          | 9 58<br>12 22  |
| 6                | 19 30          | 41 52          | 90 0           | 48 40                          | 40 9                         | 30 11                   | 25 36                | 22 17                         | 19 46          | 17 48                 | 16 12                   | 14 53          |
| 7<br>8           | 16 38          | 34 55          | 59 4           | 61 7<br>90 0                   | 44 34                        | 35 53<br>42 1           | 30 15                | 26 14                         | 23 14          | 20 52                 | 18 59                   | 17 26          |
| 9                | 14 31<br>12 23 | 30 5<br>26 29  | 48 41<br>41 56 | 62 50                          | 53 16<br>64 16               | 42 1<br>48 48           | 35 7<br>40 17        | 30 20<br>34 35                | 26 46<br>30 25 | 24 1<br>27 13         | 21 48<br>24 41          | 20 1<br>22 37  |
| . 10             | 11 35          | 23 41          | 37 0           | 53 17                          | 90 0                         | 56 38                   | 45 52                | 39 3                          | 34 11          | <b>3</b> 0 30         | 27 37                   | 25 16          |
| 11               | 10 32          | 21 27          | 33 13          | 46 <b>5</b> 0                  | 65 31                        | 69 36                   | 52 4                 | 43 48                         | 38 8           | 33 55                 | 30 47                   | 27 59          |
| 12<br>13         | 9 40           | 19 36          | 30 11<br>27 41 | 42 2<br>38 13                  | 56 39<br>50 32               | 90 0<br>67 33           | 59 15<br>63 25       | 48 58<br>54 42                | 42 17<br>46 43 | 37 26<br>41 8         | 33 <b>42</b><br>36 54   | 30 44<br>33 35 |
| 14               | 8 18           | 16 45          | 25 36          | 35 7                           | 45 58                        | 59 15                   | 90 0                 | 61 22                         | 51 31          | 45 1                  | 40 13                   | 36 30          |
| 15<br>16         | 7 45           | 15 38<br>14 40 | 23 49<br>22 17 | 32 <b>3</b> 2<br>30 <b>2</b> 0 | 42 8<br>39 4                 | 53 27<br>48 59          | 69 11<br>61 23       | 69 53                         | 56 53<br>63 6  | 49 11<br>50 12        | 43 43                   | 39 31          |
| 17               | 6 51           | 13 48          | 20 57          | 28 26                          | 39 <b>4</b><br>36 <b>2</b> 6 | 48 59<br>4 <b>5 2</b> 0 | 61 23<br>55 50       | 90 0<br>70 31                 | 71 7           | 58 44                 | 47 22<br>51 18          | 42 39<br>45 57 |
| 18               | 6 29           | 13 3           | 19 46          | 26 46                          | 34 11                        | 42 17                   | 51 32                | 63 8                          | 90 0           | 64 37                 | 55 84                   | 49 26          |
| 19<br><b>2</b> 0 | 6 9<br>5 5 1   | 12 22<br>11 46 | 18 44<br>17 48 | 25 18<br>24 1                  | 32 14<br>30 31               | 39 41<br>37 27          | 48 0<br>45 2         | 57 51<br>53 43                | 71 39<br>64 40 | 72 9<br>90 0          | 60 21  <br>65 <b>54</b> | 53 10<br>57 13 |
| 21               | 5 35           | 11 13          | 16 57          | 22 51                          | 28 59                        | 35 28                   | 42 28                |                               | 59 34          | 72 37                 | 73 4                    | 61 46          |
| 22               | 5 21           | 10 44          | 16 12          | 21 49                          | 2 <b>7</b> 37                | 33 <b>43</b>            | 40 14                | 47 22                         | 55 35          | 65 <i>5</i> 6         | 90 O                    | 67 5           |
| 23<br>24         | 5 7<br>4 55    | 10 17          | 15 31<br>14 53 | 20 52<br>20 1                  | 26 23<br>25 17               | 32 9<br>30 <b>45</b>    | 38 15<br>36 30       | 44 52<br>42 40                | 52 16<br>49 27 | 61 <i>5</i><br>57 15  | 73 29<br>67 6           | 73 52<br>90 0  |
| 25               | 4 44           | 9 30           | 14 19          | 19 14                          | 24 16                        | 29 28                   | 34 55                | 40 43                         | 46 59          | 54 2                  | 62 25                   | 74 14          |
| 26<br><b>2</b> 7 | 4 34           | 9 9            | 13 48          | 18 31                          | 23 21                        | 28 19                   | S3 S0                | 38 58                         | 44 50          | 51 18                 | 58 44                   | 68 7           |
| 28               | 4 25 4 16      | 8 50<br>8 33   | 13 19<br>12 52 | 17 51<br>17 15                 | 22 <b>2</b> 9<br>21 43       | 27 15<br>26 17          | 32 12<br>31 1        | 87 <b>23</b><br>35 <i>5</i> 7 | 42 54<br>41 10 | 48 53<br>46 47        | 55 36<br>52 57          | 63 37<br>60 3  |
| 29               | 4 8            | 8 16           | 12 27          | 16 41                          | <b>20</b> 59                 | 25 23                   | 29 56                | 34 39                         | 39 36          | 44 55                 | <i>5</i> 0 37           | 57 2           |
| 30               | 4. 0           | 8 1            |                | 16 10                          | 20 19                        | 24 34                   |                      | 33 57                         | 38 11          | 43 10                 | 48 32                   | 54 26          |
| 31<br>32         | 3 53           | 7 47           | 11 43<br>11 23 | 15 41<br>15 14                 | 19 <b>42</b><br>19 <b>8</b>  | 23 48<br>23 6           | 28 1<br>27 10        |                               | 36 52<br>35 41 | 41 37<br>40 12        | 46 <b>4</b> 0<br>45 0   | 52 9<br>50 8   |
| 33               | 3 40           | 7 22           | 11 4           | 14 48                          | 18 36                        | 22 26                   | 26 22                | 30 24                         | 34 34          | 38 54                 | 43 27                   | 48 19          |
| 34<br>35         | 3 35           | 6 59           | 10 46<br>10 30 | 14 25<br>14 3                  | 18 8<br>17 37                | 21 50<br>21 15          | 25 38<br>24 57       | 29 32<br>28 43                |                | 37 43<br>36 36        | 42 4<br>40 47           | 46 40<br>45 10 |
| 36               | 3 24           | 6 49           | 10 15          | 13 42                          | 17 11                        | 20 43                   |                      | 27 58                         |                | 35 35                 | S9 86                   | 43 48          |
| 37<br>38         | 3 19           | 6 39           | 10 0<br>9 47   | 13 22                          | 16 46                        | 20 12                   | 23 42                | 27 16                         |                | 34 38                 | 38 30<br>37 29          | 42 31          |
| 39               | 3 15           | 6 31           | 9 34           | 13 4<br>12 47                  | 16 23<br>16 1                | 19 44<br>19 17          | 23 9<br>22 <b>36</b> | 26 36<br>25 59                | 29 24          | 33 45<br><b>32</b> 55 | 36 32                   | 41 22<br>40 16 |
| 40               | 3 7            | 6 14           | 9 21           | 12.30                          | 15 <b>40</b>                 | 18 52                   | 22 7                 | 25 24                         | 28 44          | 32 9                  | <b>35 39</b>            | 39 15          |
| 42               | 2 59           | 5 59           | 8 59           | 11 59                          | 15 3                         | 13 6                    | 22 12                | 24 20                         | 27 30          | 30 45                 | 34 3                    | 37 26          |
| 44<br>46         | 2 53           | 5 46           | 8 39           | 11 33                          | 14 29<br>13 58               | 17 25<br>16 48          | 20 <b>2</b> 3        | 23 23<br>22 32                | 26 25<br>25 27 | 29 30<br>28 24        | 32 <b>38</b><br>31 23   | 35 50<br>34 26 |
| 48               | 2 41           | 5 23           | 8 5            | 10 48                          | 13 31                        | 16 15                   | 19 0                 | 21 46                         | 24 34          | 27 27                 | 30 16                   | 33 11          |
| 50<br>52         | 2 36<br>2 32   | 5 13           | 7 50           | 10 28<br>10 11                 | 13 6<br>12 44                | 15 45<br>15 18          | 18 25<br>17 53       | 21 5<br>20 29                 | 23 48<br>23 6  | 26 32<br>25 44        | 29 17<br>28 23          | 32 4           |
| 54               | 2 28           | 4 57           | 7 25           | 9 54                           | 12 24                        | 14 53                   | 17 24                | 19 55                         | 22 28          | 25 1                  | 27 35                   | 30 11          |
| 56<br>58         | 2 25           | 4 50           | 7 14 7 4       | 9 40                           | 12 6                         | 14 32                   | 16 58                | 19 25                         | 21 53<br>21 22 | 24 22<br>23 47        | 26 52<br>26 13          | 29 29          |
| <i>5</i> 8<br>60 | 2 22 2 19      | 4 43           | 6 56           | 9 27 9 15                      | 11 49<br>11 34               | 14 12<br>13 54          | 16 35<br>16 15       | 18 <i>5</i> 8                 | 20 54          | 23 47                 | 26 13<br>25 38          | 28 40<br>28 1  |
| 62               | 2 16           | 4 31           | 6 48           |                                |                              | 13 37                   | -                    | -                             | 20 30          | 22 48                 | 25 7                    | 27 26          |
| 64               | 2 14           | 4 27           | 6 41           | 8 53                           | 11 9                         | 13 23                   | 15 37                | 17 53                         | 20 7           | 22 22                 | 24 38                   | 26 51          |
| 66<br>68         | 2 12 2 9       | 4 22 4 19      | 6 34           |                                | 10 58<br>10 48               | 13 10<br>12 58          | 15 22<br>15 8        | 17 34<br>17 18                | 19 46<br>19 28 | 22 0<br>21 39         | 24 13<br>23 50          | 26 26<br>26 1  |
| 70               | 2 8            | 4 15           | 6 23           | 8 31                           | 10 39                        | 12 47                   | 14 55                | 17 8                          | 19 12          | 21 21                 | 23 30                   | 25 39          |
| 72<br>74         | 2 6 2 3        | 4 72           | 6 19           | 8 25<br>8 20                   | 10 31<br>10 25               | 12 38<br>12 30          | 14 44<br>14 35       | 16 51<br>16 40                | 18 54<br>18 45 | 21 5<br>20 51         | 23 12<br>22 56          | 25 19<br>25 2  |
| 76               | 2 3            | 4 7            | 6 11           |                                |                              | 12 23                   | 14 27                | 16 30                         | 18 34          | 20 31                 | 22 43                   | 24 47          |
| 78               | 2 5            | 4 5            | 6 8            | 8 11                           | 10 14                        | 12 16                   | 14 19                | 16 22                         | 18 25          | 20 29                 | 22 31                   | 24 34          |
| 80               | 2 2            | 4 4            | 6 5            | 8 8                            | 110 10                       | 112 11                  | 114 14               | 16 15                         | 18 17          | 20 20                 | 22 22                   | 24 24          |

TABLE LIV.

HYPERBOLIC LOGARITHMS.

| Num. | Hyp. Log. | Num.    | Hyp. Log. | Num. | Hyp. Log. | Num.           | Hyp. Log.  | Num.         | Hyp. Log.   |
|------|-----------|---------|-----------|------|-----------|----------------|------------|--------------|-------------|
|      |           |         |           |      |           | [              |            |              | <del></del> |
| 1.00 | 0.0000000 | 1.60    |           | 2.20 | 0.7884574 | 2.80           | 1.0296194  | 3.40         | 1.2237754   |
| 1.01 | 0.0099503 | 1.61    | 0.4762342 | 2.21 | 0.7929925 | 2.81           | 1,0331845  | 3.41         | 1.2267123   |
| 1.02 | 0.0198026 | 1.62    |           | 2.22 | 0.7975072 | 2.82           | 1.0367369  | 3.42         | 1.2296406   |
| 1.03 | 0.0295588 | 1.63    |           | 2.23 | 0.8020016 | 2.83           | 1.0402767  | 3,43         | 1.2325603   |
| 1.04 | 0.0392207 | 1.64    |           | 2.24 | 0.8064759 | 2.84           | 1.0438041  | 3.44         | 1.2354715   |
| 1.05 | 0.0487902 | 1.65    | 0.5007753 | 2.25 | 0 8109302 | 2.85           | 1.0473190  | 3.45<br>3.46 | 1.2383742   |
| 1.06 | 0.0582689 | 1.66    | 0.5068176 | 2.26 | 0.8153648 | 2.86           | 1.0508217  | 3.47         | 1.2412000   |
| 1.07 | 0.0676586 | 1.67    | 0.5128236 | 2.27 | 0.8197798 | 2.87           | 1.0543121  | 3.48         | 1.2470323   |
|      | 0.0769610 | 1.68    | 0.5187938 | 2.28 | 0.8241754 | $2.88 \\ 2.89$ | 1.0577903  | 3.49         | 1.2470323   |
| 1.09 | 0.0861777 | 1.69    | 0.5247285 | 2.29 | 0.8285518 | 2.69           | 1.0612565  |              | 1.2433017   |
| 1.10 | 0.0958103 | 1.70    | 0.5306283 | 2.30 | 0.8329091 | 2.90           | 1.0647107  | 3.50         | 1.2527630   |
| 1.11 | 0.1043600 | 1.71    | 0.5364934 | 2.31 | 0.8372475 | 2.91           | 1.0681531  | 3.51         | 1.2556160   |
| 1.12 | 0.1133287 | 1.72    | 0.5423243 | 2.32 | 0.8415672 | 2.92           | 1.0715836  | 3.52         | 1.2584610   |
| 1.18 | 0.1222176 | 1.73    |           | 2.33 | 0.8458683 | 2.93           | 1.0750024  | 3,53         | 1.2612979   |
| 1.14 | 0.1310283 | 1.74    | 0.5538851 | 2.34 | 0.8501509 | 2.94           | 1.0784096  | 3.54         | 1.2641267   |
| 1.15 | 0.1397619 | 1.75    | 0.5596158 | 2.35 | 0.8544153 | 2.95           | 1.0818052  | 3.55         | 1.2669476   |
| 1.16 | 0.1484200 | 1.76    | 0.5653138 | 2.36 | 0.8586616 | 2.96           | 1.0851893  | 3.56         | 1.2697605   |
| 1.17 | 0.1570037 | 1.77    | 0.5709795 | 2.37 | 0.8628899 | 2.97           | 1.0885619  | 3.57         | 1.2725656   |
| 1.18 | 0.1655144 | 1.78    | 0.5766134 | 2.38 | 0.8671005 | 2.98           | 1.0919233  | 3.58         | 1.2753628   |
| 1.19 | 0.1739533 | 1.79    | 0.5822156 | 2.39 | 0.8712933 | 2.99           | 1.0952734  | 3.59         | 1.2781522   |
| 1.20 | 0.1823216 | 1.80    | 0.5877867 | 2.40 | 0.8754687 | 3.00           | 1.0986123  | 3.60         | 1.2809338   |
| 1.21 | 0.1906204 | 1.81    | 0.5933268 | 2.41 | 0.8796267 | 3.01           | 1.1019401  | 3.61         | 1.2837078   |
| 1.22 | 0.1988509 | 1.82    | 0.5988365 | 2.42 | 0.8837675 | 3.02           |            | 3.62         | 1.2864740   |
| 1.23 | 0.2070142 | 1.83    | 0.6043160 | 2.43 | 0.8878913 | 3.03           |            | 3.63         | 1.2892326   |
| 1.24 | 0.2151114 | 1.84    | 0.6097656 | 2.44 | 0.8919980 | 3.04           |            | 3.64         | 1.2919837   |
| 1.25 | 0.2231436 | 1.85    |           | 2.45 | 0.8960880 | 3.05           | 1.1151416  | 3.65         | 1.2947272   |
| 1.26 | 0.2311117 | 1.86    | 0.6205765 | 2.46 | 0.9001613 | 3.06           | 1.1184149  | 3.66         | 1.2974631   |
| 1.27 | 0.2390169 | 1.87    | 0.6259384 | 2.47 | 0.9042182 | 3.07           | 1.1216776  | 3.67         | 1.3001917   |
| 1.28 | 0.2468601 | 1.88    | 1         | 2.48 | 0.9082586 | 3.08           | 1.1249296  | 3.68         | 1.3029128   |
| 1.29 | 0.2546422 | 1.89    | 0.6365768 | 2.49 | 0.9122827 | 3.09           | 1.1281711. | 3.69         | 1.3056265   |
| 1.30 | 0.2628643 | 1.90    | 0.6418539 | 2.50 | 0.9162907 | 3.10           | 1.1314021  | 3.70         | 1.3083528   |
| 1.31 | 0.2700271 | 1.91    | 0.6471032 | 2.51 | 0.9202828 | 3.11           | 1.1346227  | 3.71         | 1.9110319   |
| 1.32 | 0.2776317 | 1.92    | 0.6523252 | 2.52 | 0.9242589 | 3.12           | 1.1378330  | 3.72         | 1.3137237   |
| 1.33 | 0.2851789 | 1.93    | 0.6575200 | 2.53 | 0.9282193 | 3.13           |            | 3.73         | 1.3164082   |
| 1.34 | 0.2926696 | 1.94    | 0.6626880 | 2.54 | 0.9321641 | 3.14           |            | 3.74         | 1.3190856   |
| 1.35 | 0.3001046 | -1.95   | 0.6678294 | 2.55 | 0.5360934 | 3.15           | 1.1474025  | 3.75         | 1.3217558   |
| 1.36 | 0.3074847 | 1.96    | 0.6729445 | 2.56 | 0.9400073 | 3.16           | 1.1505720  | 3.76         | 1.3244190   |
| 1.37 | 0.3148107 | 1.97    |           | 2.57 | 0.9439059 | 3.17           | 1.1537316  | 3.77         | 1.3270750   |
| 1.38 | 0.3220835 | 1.98    |           | 2.58 | 0.9477894 | 3.18           | 1.1568812  | 3.78         | 1.3297240   |
| 1.39 | 0.3293037 | 1.99    | 0.6881346 | 2.59 | 0.9516579 | 3.19           | 1.1600209  | 3.79         | 1.3323660   |
| 1.40 | 0.3364722 | 2.00    | 0.6931472 | 2.60 | 0.9555114 | 3.20           | 1.1631508  | 3.80         | 1.3350011   |
| 1.41 | 0.3435897 | 2.01    | 0.6981347 | 2.61 | 0.9593502 | 3.21           | 1.1662709  | 3.81         | 1.3376292   |
| 1.42 | 0.3506569 | 2.02    |           | 2.62 | 0.9631743 | 3.22           | 1.1693814  | 3.82         | 1.3402504   |
| 1.43 | 0.3576745 | 2,03    |           | 2.63 | 0.9669838 | 3.23           | 1.1724821  | 3.83         | 1.3428648   |
| 1.44 | 0.3646431 | 2.04    |           | 2.64 | 0.9707789 | 3.24           | 1.1755733  | 3.84         | 1.3454724   |
| 1.45 | 0.3715636 | 2.05    | 0.7178398 | 2.65 |           | 3 25           | 1.1786550  | 3.85         | 1.3480731   |
| 1.46 | 0.3784364 | 2,06    |           | 2.66 |           | 3.26           |            | 3.86         | 1.3506672   |
| 1.47 | 0.3852624 | 2.07    |           | 2.67 | 0.9820785 | 3.27           | 1.1847900  | 3.87         | 1.3532545   |
| 1.48 | 0.3920421 | 2.08    |           | 2.68 |           | 3.28           | 1.1878484  | 3.88         | 1.3558352   |
| 1.49 | 0.3987761 | 2.09    | 0.7371641 | 2.69 | 0.9895412 | 3.29           | 1.1908876  | 3.89         | 1.3584092   |
| 1.50 | 0.4054651 | 2.10    | 0.7419373 | 2.70 | 0 9932518 | 3.30           | 1.1939225  | 3.90         | 1.3609766   |
| 1.51 | 0.4121097 | 2.11    | 0.7466879 | 2.71 | 0.9969486 | 3.31           | 1.1969482  | 3.91         | 1.3635374   |
| 1.52 | 0.4187103 | 2,12    |           | 2.72 | 1.0006319 | 3.32           | 1.1999648  | 3.92         | 1.3660917   |
| 1.53 | 0.4252677 | 2.13    |           | 2.73 |           | 3.33           | 1.2029723  | 3.93         | 1.3686394   |
| 1.54 | 0.4317824 | 2.14    |           | 2.74 |           | 3.34           |            | 3.94         | 1.3711807   |
| 1.55 | 0.4382549 | 2.15    |           | 2.75 |           | 3.35           |            | 3.95         | 1,3737156   |
| 1.56 | 0.4446858 | 2.16    |           | 2.76 |           | 3.36           |            | 3.96         | 1.3769440   |
| 1,57 | 0.4510756 | 2.17    |           | 2.77 | 1.0188473 | 3.37           |            | 3.97         | 1,3787661   |
| 1.58 | 0.4574248 | 2.18    |           | 2.78 |           | 3.38           |            | 3.98         | 1.3812818   |
| 1.59 | 0.4637340 | 11 2.19 | 0.7839015 | 2.79 | 1.0260416 | 4 3.39         | 1.2208299  | 3,99         | 1.3837919   |
| Į    |           |         |           |      |           |                |            |              |             |

TABLE LIV.

HYPERBOLIC LOGARITHMS.

| yp. Log.  | Num.   | Hyp. Log. | Num. | Hyp. Log.            | Num. | Hyp. Log.   | Num. | Hyp. Log. |
|-----------|--------|-----------|------|----------------------|------|-------------|------|-----------|
| .3862944  | 4.60   | 1.5260563 | 5.20 | 1.6486586            | 5.80 | 1.7578579   | 6.40 | 1.8562980 |
| .3887912  | 4.61   | 1.5282278 | 5.21 | 1.6505799            | 5.81 | 1.7595806   | 6.41 | 1.8578593 |
| .3912819  | 4.62   | 1.5303947 | 5.22 | 1.6524974            | 5.82 | 1.7613003   | 6.42 | 1.8594181 |
| .3937664  | 4.63   | 1.5325569 | 5.23 | 1.6544113            | 5.83 | 1.7630170   | 6.43 | 1.8609745 |
| 3962447   | 4.64   | 1.5347144 | 5.24 | 1.6563215            | 5.84 | 1.7647308   | 6.44 | 1.8625285 |
| .3987169  | 4.65   | 1.5368672 | 5.25 | 1.6582281            | 5.85 | 1.7664416   | 6.45 | 1.8640801 |
| .4011829  | 4.66   | 1.5390154 | 5.26 | 1.6601910            | 5.86 | 1.7681496   | 6.46 | 1.8656293 |
| .4036429  | 4.67   | 1.5411591 | 5.27 | 1.6620304            | 5.87 | 1.7698546   | 6.47 | 1.8671761 |
| .40609701 | 4.68   | 1.5432981 | 5.28 | 1.6639261            | 5.88 | 1.7715568   | 6.48 | 1.8687205 |
| 4083450   | 4.69   | 1.5454326 | 5.29 | 1.6658182            | 5.89 | 1.7732560   | 6.49 | 1.8702625 |
|           |        |           |      | <del></del>          |      |             |      |           |
| 1.4109870 | 4.70   | 1.5475625 | 5.30 | 1.6677068            | 5.90 | 1.7749524   | 6.50 | 1.8718022 |
| 1.4134230 | 4.71   | 1.5496879 | 5.31 | 1.6695918            | 5.91 | 1.7766458   | 6.51 | 1.8733395 |
| 1.4158532 | 4.72   | 1.5518088 | 5.32 | 1.6714733            | 5.92 | 1.7783364   | 6.52 | 1.8748744 |
| 1.4182774 | 4.73   | 1.5539252 | 5.38 | 1.6733512            | 5.93 | 1.7800242   | 6.53 | 1.8764069 |
| 1.4206958 | 4.74   | 1.5560371 | 5.34 | 1.6752257            | 5.94 | 1.7817091   | 6.54 | 1.8779372 |
| 1.4231083 | 4.75   | 1.5581446 | 5.35 | 1.6770966            | 5.95 | 1.7833912   | 6.55 | 1.8794650 |
| 1.4255151 | 4.76   | 1.5602476 | 5.36 | 1.6789640            | 5.96 | 1.7850705   | 6.56 | 1.8809906 |
| 1.4279160 | 4.77   | 1.5623463 | 5.37 | 1.6808279            | 5.97 | 1.7867469   | 6.57 | 1.8825138 |
| 1.4303112 | 4.78   | 1.5644405 | 5.38 | 1.6826884            | 5 98 | 1.7884206   | 6.58 | 1.8840347 |
| 1.4327007 | 4.79   | 1.5665303 | 5.39 | 1.6845454            | 5.99 | 1.7900914   | 6.59 | 1.8855533 |
| 1.4350845 | 4.80   | 1.5686159 | 5.40 | 1.6863990            | 6.00 | 1.7917595   | 6.60 | 1.8870696 |
| 1.4374626 | 4.81   | 1.5706971 | 5.41 | 1.6882491            | 6.01 | 1.7934247   | 6.61 | 1.8885836 |
| 1.4598951 | 4.82   | 1.5727739 | 5.42 | 1.6900958            | 6.02 | 1.7950873   | 6.62 | 1.8900954 |
| 1.4422020 | 4.83   | 1.5748465 | 5.43 | 1.6919391            | 6.03 | 1.7967470   | 6.63 | 1.8916048 |
| 1.4445633 | 4.84   | 1.5769147 | 5.44 | 1.6937791            | 6.04 | 1.7984040   | 6.64 | 1.8931120 |
| 1.4469190 | 4.85   | 1.5789787 | 5.45 | 1.6956156            | 6.05 | 1.8000583   | 6.65 | 1.8946169 |
| 1.4492692 | 4.86   | 1.5810384 | 5.46 | 1.6974488            | 6.06 | 1.8017098   | 6.66 | 1.8961195 |
| 1.4516138 | 4.87   | 1.5830939 | 5.47 | 1.6992786            | 6.07 | 1.8033586   | 6.67 | 1.8976198 |
| 1.4539530 | 4.88   | 1.5851452 | 5.48 | 1.7011051            | 6.08 | 1.8050047   | 6.68 | 1.8991180 |
| 1.4562868 | 4.89   | 1.5871923 | 5.49 | 1.7029283            | 6.09 | 1.8066481   | 6.69 | 1.9006139 |
|           |        |           |      |                      |      |             | [[   |           |
| 1.4586150 | 4.90   | 1.5892352 | 5.50 | 1.7047481            | 6.10 | 1.8082888   | 6.70 | 1.9021075 |
| 1.4609379 | 4.91   | 1.5912739 | 5.51 | 1.7065646            | 6.11 | 1.8099268   | 6.71 | 1.9035990 |
| 1.4632554 | 4.92   | 1.5933085 | 5.52 | 1.7083779            | 6.12 | 1.8115621   | 6.72 | 1.9050882 |
| 1.4655675 | 4.93   | 1.5953390 | 5.53 | 1.7101878            | 6.13 | 1.8131947   | 6.73 | 1.9065751 |
| 1.4678749 | 4.94   | 1.5973653 | 5.54 | 1.7119945            | 6.14 | 1.8148247   | 6.74 | 1.9080599 |
| 1.4701758 | 4.95   | 1.5993876 | 5.55 | 1.7137979            | 6.15 | 1.8164521   | 6.75 | 1.9095425 |
| 1.4724721 | 4.96   | 1.6014057 | 5.56 | 1.7155981            | 6.16 | 1.8180768   | 6.76 | 1.9110229 |
| 1.4747630 | 4.97   | 1.6034198 | 5.57 | 1.7173951            | 6.17 | 1.8196988   | 6.77 | 1.9125011 |
| 1.4770487 | 4.98   | 1.6054299 | 5.58 | 1.7191888            | 6.18 | 1.8213183   | 6.78 | 1.9139771 |
| 1.4793292 | 4.99   | 1.6074359 | 5.59 | 1.7209793            | 6.19 | 1.8229351   | 6.79 | 1.9154509 |
| 1.4816045 | 5.00   | 1.6094379 | 5.60 | 1.7227666            | 6.20 | 1.8245493   | 6.80 | 1.9169226 |
| 1.4838747 | 5.01   | 1.6114359 | 5.61 | 1.7245507            | 6.21 | 1.8261609   | 6.81 | 1.9183921 |
| 1.4861397 | 5.02   | 1.6134299 | 5.62 | 1.7263317            | 6.22 | 1.8277699   | 6.82 |           |
| 1.4883996 | 5.03   |           | 5.63 | 1.7281094            | 6.23 | 1.8293763   | 6.83 | 1.9213247 |
| 1.4906544 | 5.04   |           | 5.64 | 1.7298841            | 6.24 | 1.8309802   | 6.84 | 1.9227877 |
| 1.4929041 | 5.05   |           | 5.65 | 1.7316555            | 6.25 | 1.8325815   | 6.85 | 1.9242487 |
| 1.4929041 | 5.06   |           | 5.66 | 1.7334239            | 6.26 | 1.8341802   | 6.86 | 1.9257074 |
| 1.4973884 | 5.07   | 1.6233408 | 5.67 | 1.7351891            | 6.27 | 1.8357764   | 6.87 | 1.9271641 |
| 1.4996230 | 5.08   | 1.6253113 | 5.68 | 1.7369512            | 6.28 | 1.8373700   | 6.88 | 1.9286187 |
| 1.5018527 | 5.09   |           | 5.69 | 1.7387102            | 6.29 | 1.8389611   | 6.89 | 1.9300711 |
|           |        |           |      |                      |      |             |      |           |
| 1.5040774 | 5.10   |           | 5.70 | 1.7404662            | 6.30 | 1.8405496   | 6.90 | 1.9315214 |
| 1.5062971 | 5.11   | 1.6311994 | 5.71 | 1.7422190            | 6.31 | 1.8421357   | 6.91 | 1.9329696 |
| 1.5085120 | 5.12   |           | 5.72 |                      | 6.32 |             | 6.92 | 1.9344158 |
| 1.5107219 | 5.13   |           | 5.78 |                      | 6.33 |             | 6.93 | 1.9358598 |
| 1.5129270 | 5.14   |           | 5.74 |                      | 6.34 | 1.8468788   | 6.94 | 1.9373018 |
| 1.5151272 | 5.15   | 1.6389967 | 5.75 | 1.7491998            | 6.35 |             | 6,95 | 1.9387417 |
| 1.5173226 | 5.16   |           | 5.76 |                      | 6.36 |             | 6.96 | 1.9401795 |
| 1.5195132 | 5.17   |           | 5.77 | 1.7526721            | 6.37 | 1.8515995   | 6.97 | 1.9416152 |
| 1.5216990 | 5.18   |           | 5.78 | . 1.754 <b>4</b> 037 | 6.38 | 1 8531681   | 6.98 |           |
| 1.5238800 | 1 5.19 | 1.6467337 | 5.79 | 1.7561323            | 6.39 | 1.8547343   | 6.99 | 1.9444605 |
|           |        |           |      |                      |      | <del></del> |      |           |

# · TABLE LIV.

## HYPERBOLIC LOGARITHMS.

| 1        |           |      |            | -    |           |      |                    |         |                   |
|----------|-----------|------|------------|------|-----------|------|--------------------|---------|-------------------|
| Num      | Hyp. Log. | Num. | Hyp. Log.  | Num. | Hyp. Log. | Num. | Hyp. Log.          | Num.    | Hyp. Log.         |
| 7 00     |           |      |            | II   |           | ]    |                    |         | <u></u>           |
| 7.00     | 1.9459101 | 7.60 | 2.0281482  | 8.20 | 2.1041342 | 8.80 | 2.1747517          | 9.40    | 2.2407097         |
| 7.01     | 1.9473377 | 7.61 | 2.0294632  | 8.21 | 2.1053529 | 8.81 | 2.1758874          | 9.41    | 2.2417729         |
| 7.02     |           | 7.62 | 2.0307764  | 8.22 | 2.1065702 | 8.82 | 2.1770219          | 9.42    | 2.2428351         |
| 7.03     | 1.9501867 | 7.63 |            | 8.23 | 2.1077860 | 8.83 | 2.1781 <i>55</i> 0 | 9.49    | 2.2438961         |
| 7.04     | 1.9516082 | 7.64 | 2.0333976  | 8.24 | 2.1090003 | 8.84 | 2.1792869          | 9.44    | 2.2449560         |
| 7.05     | 1.9530276 | 7.65 | 2.0347056  | 8.25 | 2.1102125 | 8.85 | 2.1804175          | 9.45    | 2.2460147         |
| 7.06     | 1.9544451 | 7.66 | 2.0360120  | 8.26 | 2.1114246 | 8.86 | 2.181 <b>54</b> 68 | 9.46    | 2.2470724         |
| 7.07     | 1.9558605 | 7.67 | 2.0373166  | 8.27 | 2.1126345 | 8.87 | 2.1 <b>82674</b> 8 | 9.47    | 2.2481289         |
| 7.08     | 1.9572739 | 7.68 | 2.0386195  | 8.28 | 2.1138430 | 8.88 | 2.1838016          | 9.48    | 2.2491848         |
| 7.09     | 1.9586853 | 7.69 | 2.0399208  | 8.29 | 2.1150500 | 8.89 | 2.184 <b>92</b> 70 | 9.49    | 2.2502386         |
| 7.10     | 1.9600948 | 7.70 | 9 0410000  | 8.30 | 2.1162555 | 9 00 | 2.1860513          | 9.50    | 0.0510010         |
| 7.11     |           |      | 2.0412203  | 17 1 |           | 8.90 |                    |         | 2.2512918         |
| 7.12     | 1.9615022 | 7.71 | 2.0425182  | 8.31 | 2.1174596 | 8.91 | 2.1871742          | 9.51    | 2.2523439         |
|          | 1.9629077 | 7.72 | 2.0438144  | 8.32 | 2.1186623 | 8.92 | 2.1882959          | 9.52    | 2.2538947         |
| 7.13     | 1.9643112 | 7.73 | 2.0451089  | 8.33 | 2.1198634 | 8.93 | 2.1894164          | 9.53    | 2.2544446         |
| 7.14     | 1.9657128 | 7.74 | 2.0464017  | 8.34 | 2.1210632 | 8.94 | 2.1905356          | 9.54    | 2.2554935         |
| 7.15     | 1.9671124 | 7.75 | 2.0476928  | 8.35 | 2.1222615 | 8.95 | 2.1916535          | 9.55    | 2.2565411         |
| 7.16     | 1.9685100 | 7.76 | 2.0489823  | 8.36 | 2.1234584 | 8.96 | 2.1927702          | 9.56    | 2.257587 <b>7</b> |
| 7.17     | [.9699056 | 7.77 | 2.0502702  | 8.37 | 2.1246539 | 8.97 | 2.1938857          | 9.57    | 2.2586382         |
| 7.18     | 1.9712994 | 7.78 | 2.0515563  | 8.38 | 2.1258479 | 8.98 | 2.1949999          | 9.58    | 2.2596775         |
| 7.19     | 1.9726912 | 7.79 | 2.0528409  | 8.39 | 2.1270405 | 8.99 | 2.1961028          | 9.59    | 2.2607209         |
| 7.20     | 1 0740010 |      | 0.0541007  | 0 40 | 0 1000017 | 0.00 | 0.1070040          | 0 60    | 0.0015051         |
|          | 1.9740810 | 7.80 | 2.0541237  | 8.40 | 2.1282317 | 9.00 | 2.1972246          | 9.60    | 2.2617631         |
| 7.21     | 1.9754690 | 7.81 | 2.0554050  | 8.41 | 2.1294215 | 9.01 | 2.1983851          | 9.61    | 2.2628042         |
| 7.22     | 1.9768550 | 7.82 | 2.0566846  | 8.42 | 2.1306098 | 9.02 | 2.1994443          | 9.62    | 2.2638443         |
| 7.2S     | 1.9782390 | 7.83 | 2.0579625  | 8.43 | 2.1817968 | 9.03 | 2.2005524          | 9.63    | 2.2648832         |
| 7.24     | 1.9796212 | 7.84 | 2.0592388  | 8.44 | 2.1929823 | 9.04 | 2.2016592          | 9.64    | 2.2659211         |
| 7.25     | 1.9810015 | 7.85 | 2.0605135  | 8.45 | 2.1341664 | 9.05 | 2.2027648          | 9.65    | 2.2669579         |
| 7.26     | 1.9823798 | 7.86 | 2.0617866  | 8.46 | 2.1353492 | 9.06 | 2.2038691          | 9.66    | 2.2679936         |
| 7.27     | 1.9837563 | 7.87 | 2.0630581  | 8.47 | 2.1365305 | 9.07 | 2.2049723          | 9.67    | 2.2690283         |
| 7.28     | 1.9851309 | 7.88 | 2.0643279  | 8.48 | 2.1377104 | 9.08 | 2.2060742          | 9.68    | 2.2700619         |
| 7.29     | 1.9865035 | 7.89 | 2.0655961  | 8.49 | 2.1388890 | 9.09 | 2.2071749          | 9.69    | 2.2710944         |
|          |           |      |            |      |           |      | 2 22222            |         |                   |
| 7.30     | 1.9878743 | 7.90 | 2.0668628  | 8.50 | 2.1400662 | 9.10 | 2.2082744          | 9.70    | 2.2721259         |
| 7.31     | 1.9892433 | 7.91 | 2.0681278  | 8.51 | 2.1412419 | 9.11 | 2.2093727          | 9.71    | 2.2731563         |
| 7.32     | 1.9906103 | 7.92 | 2.0693912  | 8.52 | 2.1424163 | 9.12 | 2.2104698          | 9.72    | 2.2741856         |
| 7.33     | 1.9919755 | 7.93 | 2.0706530  | 8.53 | 2.1435894 | 9.13 | 2.2115657          | 9.73    | 2.2752139         |
| 7.34     | 1.9933388 | 7.94 | 2.0719133  | 8.54 | 2.1447610 | 9.14 | 2.2126604          | 9.74    | 2.2762411         |
| 7.35     | 1.9947003 | 7.95 | 2.0731719  | 8.55 | 2.1459313 | 9.15 | 2.2137 <i>5</i> 39 | 9.75    | 2.2772673         |
| 7.36     | 1.9960599 | 7.96 | 2.0744290  | 8.56 | 2.1471002 | 9.16 | 2.2148462          | 9.76    | 2.2782924         |
| 7.37     | 1.9974177 | 7.97 | 2.0756845  | 8.57 | 2.1482677 | 9.17 | 2.21 <i>5</i> 9373 | 9.77    | 2.2793165         |
| 7.38     | 1.9987736 | 7.98 | 2.0769384  | 8.58 | 2.1494340 | 9.18 | 2.2170272          | 9.78    | 2.2803395         |
| 7.39     | 2.0001277 | 7.99 | 2.0781907  | 8.59 | 2.1505988 | 9.19 | 2.2181159          | 9.79    | 2,2813615         |
| 1 = 10 l | 0.0014000 |      | 0.070444.5 |      | 0.1515000 | [    | 0.0100005          | 0.00    | 0.000004          |
| 7.40     | 2.0014800 | 8.00 | 2.0794415  | 8.60 | 2.1517622 | 9.20 | 2.2192035          | 9.80    | 2.2823824         |
| 7.41     | 2.0028304 | 8.01 | 2.0806908  | 8.61 | 2.1529244 | 9.21 | 2.2202898          | 9.81    | 2.2834028         |
| 7.42     | 2.0041791 | 8.02 | 2.0819384  | 8.62 | 2.1540851 | 9.22 | 2.2213750          | 9.82    | 2.2844211         |
| 7.48     | 2.0055259 | 8.03 | 2 0831845  | 8.63 | 2.1552445 | 9.23 | 2.2224590          | 9.83    | 2.2854389         |
| 7.44     | 2.0068708 | 8.04 | 2.0844291  | 8.64 | 2.1564026 | 9.24 | 2.2235419          | 9.84    | 2.2864557         |
| 7.45     | 2.0082140 | 8.05 | 2.0856721  | 8.65 | 2.1575593 | 9.25 | 2.2246236          | 9.85    | 2.2874714         |
| 7.46     | 2.0095554 | 8.06 | 2.0869136  | 8.66 | 2.1587147 | 9.26 | 2.2257040          | 9.86    | 2.2884861         |
| 7.47     | 2.0108950 | 8.07 | 2.0881535  | 8.67 | 2.1598688 | 9.27 | 2.2267884          | 9.87    | 2.289499\$        |
| 7.48     | 2.0122328 | 8.08 | 2.0893919  | 8.68 | 2.1610215 | 9.28 | 2.2278615          | 9.88    | 2.290512          |
| 7.49     | 2.0135688 | 8.09 | 2.0906287  | 8.69 | 2.1621729 | 9.29 | 2.2289385          | 9.89    | 2.2915241         |
| 7.50     | 2.0149030 | 8.10 | 2.0918641  | 8.70 | 2.1633230 | 9.30 | 2.2300144          | 9.90    | 2.292534          |
| 7.51     | 2.0149030 |      | 2.0918841  | 8.71 | 2.1633230 | 9.30 | 2.2300144          | 9.91    | 2.293544          |
| 7.52     |           | 8.11 |            |      |           |      |                    |         |                   |
|          | 2.0175661 | 8.12 | 2.0943301  | 8.72 | 2.1656192 | 9.32 | 2.2321626          | 9.92    | 2.294552          |
| 7.53     | 2.0188950 | 8.13 | 2.0955609  | 8.73 | 2.1667654 | 9.83 | 2.2332350          | 9 93    | 2.295560          |
| 7.54     | 2.0202222 | 8.14 | 2.0967901  | 8.74 | 2.1679102 | 9.34 |                    | 9.94    |                   |
| 7.55     | 2.0215476 | 8.15 | 2.0980179  | 8.75 | 2.1690537 | 9.35 | 2.2353769          | 9.95    |                   |
| 7.56     | 2.0228712 | 8.16 | 2.0992442  | 8.76 |           | 9.36 | 2.2364453          | 9.96    |                   |
| 7.57     | 2.0241931 | 8.17 | 2.1004689  | 8.77 | 2.1713368 | 9.37 | 2.2375131          | 9.97    |                   |
| 7.58     | 2.0255132 | 8.18 | 2.1016922  | 8.78 | 2.1724764 | 9.38 | 2.2385797          | 9.98    |                   |
| 7.59     | 2.0268316 | 8.19 | 2.1029139  | 8.79 | 2.1736147 | 9.39 | 2.2396453          | 11.9.99 | 2.301584          |
|          |           |      |            |      |           |      |                    |         |                   |

TABLE LIV.

HYPERBOLIC LOGARITHMS.

| um.        | Hyp. Log.              | Num. | Hyp. Log. | Num. | Hyp. Log.  | Num.     | Hyp. Log.          | Num.     | Hyp. Log.          |
|------------|------------------------|------|-----------|------|------------|----------|--------------------|----------|--------------------|
| 10         | 2.3025851              | 70   | 4.2484952 | 130  | 4.8675345  | 190      | 5.2470241          | 250      | 5.5214609          |
| ii         | 2.3978953              | 71   | 4.2626799 | 131  | 4.8751973  | 191      | 5.2522734          | 251      | 5.5254529          |
| 12         | 2.4849066              | 72   | 4.2766661 | 132  | 4.8828019  | 192      | 5.2574954          | 252      | 5.5294291          |
| 13         | 2.5649491              | 73   | 4.2904594 | 133  | 4.8903491  | 193      | 5 2626902          | 253      | 5.5333895          |
| 14         | 2.6390573              | 74   | 4.3040651 | 134  | 4.8978398  | 194      | 5.2678582          | 254      | 5.5373343          |
| 15         |                        | 75   | 4.3174881 | 135  | 4.9052748  | 195      | 5.2729996          | . 255    | 5.5412635          |
| 16         | 2.7080502<br>2.7725887 | 76   | 4.3307333 | 136  | 4.9126549  | 196      | 5.2781147          | 256      | 5.5451774          |
| 17         |                        | 77   | 4.3438054 | 137  | 4.9199809  | 197      | 5.2832037          | 257      | 5.5490761          |
| 18         | 2,8332133<br>2,8903718 | 78   | 4.3567088 | 138  | 4.9272537  | 198      | 5.2882670          | 258      | 5.5529596          |
| 19         | 2.9444390              | 79   | 4.3694479 | 139  | 4.9344789  | 199      | 5.2933048          | 259      | 5.5568281          |
| 19         | 2.9444390              | 15   | 1.0051113 |      |            | <u> </u> |                    | 'l'      | F F000010          |
| 20         | 2.9957323              | 80   | 4.3820266 | 140  | 4.9416424  | 200      | 5.2983174          | 260      | 5.5606816          |
| 21         | 3.0445224              | 81   | 4.3941492 | 141  | 4.9487599  | 201      | 5.3033049          | 261      | 5.5645204          |
| 22         | 3.0910425              | 82   | 4.4067192 | 142  | 4.9558271  | 202      | 5.3082677          | 262      | 5.5683445          |
| 23         | 3.1354942              | 83   | 4.4188406 | 143  | 4.9628446  | 203      | 5.3132060          | 263      | 5.5721540          |
| 24         | 3.1780538              | 84   | 4,4308168 | 144  | 4.9698133  | 204      | 5.3181200          | 264      | 5.5759491          |
| 25         | 3.2188758              | 85   | 4,4426513 | 145  | 4.9767837  | 205      | 5.8230100          | 265      | 5.5797298          |
| 26         | 3.2580965              | 86   | 4.4543473 | 146  | 4.9336066  | 206      | 5.3278762          | 266      | 5.5834963          |
| 27         | 3.2958369              | 87   | 4.4659081 | 147  | 4.9904326  | 207      | 5.3327188          | 267      | 5.5872487          |
| 28         | 3.3322045              | 88   | 4,4773368 | 148  | 4.9972123  | 208      | 5.337 <i>5</i> 381 | 268      | 5.5909870          |
| 29         | 3.3672958              | 89   | 4.4886364 | 149  | 5.0039463  | 200      | 5.3423343          | 269      | 5.5947114          |
| 30         | 3.4011974              | 90   | 4.4998097 | 150  | 5.0106353  | 210      | 5.3471075          | 270      | 5.5984220          |
| 31         | 3.4339872              | 91   | 4.5108595 | 151  | 5.0172798  | 211      | 5.3518581          | 271      | 5.6021188          |
| 32         | 3.4657359              | 92   | 4.5217886 | 152  | 5.0238805  | 212      | 5.3565863          | 272      | 5.6058021          |
| 33         | 3.4965076              | 93   | 4.5325995 | 153  | 5.0304379  | 213      | 5.3612922          | 273      | 5.6094718          |
| 34         | 3.5263605              | 94   | 4.5432948 | 154  | 5.0369526  | 214      | 5.3659760          | 274      | 5.6131281          |
| 35         | 3.5553481              | 95   | 4.5538769 | 155  | 5.0434251  | 215      | 5.3706380          | 275      | 5.6167711          |
| 36         | 3.5835189              | 96   | 4.5643482 | 156  | 5.0498560  | 216      | 5.3752784          | 276      | 5.6204009          |
| 37         | 3.6109179              | 97   | 4.5747110 | 157  | 5.0562458  | 217      | 5.3798974          | 277      | 5.6240175          |
| 38         | 3.6375862              | 98   | 4.5849675 | 158  | 5.0625950  | 218      | 5.3844951          | 278      | 5.6276211          |
| 39         | 3.6635616              | 99   | 4.5951199 | 159  | 5.0689042  | 219      | 5.3890717          | 279      | 5.6312118          |
|            | 0.0000010              |      |           | l¦   |            |          |                    |          | F C04700C          |
| 40         | 3.6888795              | 100  | 4.6051702 | 160  | 5.0751738  | 220      | 5.3936275          | 280      | <b>.</b> 5.6347896 |
| 41         | 3.7135721              | 101  | 4.6151205 | 161  | 5.0814044  | 221      | 5.8981627·         |          | 5.6383547          |
| 42         | 3.7376696              | 102  | 4.6249728 | 162  | 5.0875963  | 222      | 5.4026774          | 282      | 5.6419071          |
| 43         | 3.7612001              | 103  | 4.6847290 | 163  | 5.0937502  | 223      | 5.4071718          | 288      | 5.6454469          |
| 44         | 3.7841896              | 104  | 4.6443909 | 164  | 5.0998664  | 224      | 5.4116461          | 284      | 5.6489742          |
| 45         | 3.8066625              | 105  | 4.6539604 | 165  | 5.1059455  | 225      | 5.4161004          | 285      | 5.6524892          |
| 46         | 3.8286414              | 106  | 4.6634391 | 166  | 5.1119878  | 226      | 5.4205350          | 286      | 5.6559918          |
| 47         | 3.8501476              | 107  | 4.6728288 | 167  | 5.1179938  | 227      | 5.4249500          | 287      | 5.6594822          |
| 48         | 3.8712010              | 108  | 4.6821312 | 168  | .5.1239640 | 228      | 5.4293456          | 288      | 5.6629605          |
| 49         | 3.8918203              | 109  | 4.6913479 | 169  | 5.1298987  | 229      | 5.4337220          | 289      | 5.6664267          |
| 50         | 3,9120230              | 110  | 4.7004804 | 170  | 5.1357984  | 230      | -5.4380793         | 290      | 5.6698809          |
| 51         | 3,9318256              | 111  | 4.7095302 | 171  | 5.1416636  | 231      | 5.4424177          | 291      | 5.6733233          |
| 52         | 3.9512437              | 112  | 4.7184989 | 172  | 5.1474945  | 232      | 5.4467374          | 292      | 5.6767 <i>5</i> 38 |
| 53         | 3.9702919              | 113  | 4.7273878 | 173  | 5,1532916  | 233      | 5.4510385          | 293      | 5.6801726          |
| 54         | 3.9889840              | 114  | 4.7361984 | 174  | 5.1590553  | 234      | 5.4553211          | 294      | 5.6835798          |
| 55         | 4.0073332              | 115  | 4.7449321 | 175  | 5.1647860  | 235      | 5.4595855          | 295      | 5.6869754          |
| 56         | 4.0253517              | 116  | 4.7535902 | 176  | 5.1704840  | 236      | 5.4638318          | 296      | 5.6903595          |
| 57         | 4.0430513              | 117  | 4.7621739 | 177  | 5.1761497  | 237      | 5.4680601          | 297      | 5.6937321          |
| 58         | 4.0604430              | 118  | 4.7706846 | 178  | 5.1817836  | 238      | 5.4722707          | 298      | 5.6970935          |
| <b>5</b> 9 | 4.0775374              | 119  | 4.7791235 | 179  | 5.1873858  | 239      | 5.4764636          | 299      | 5.7004436          |
| 60         | 4.0949446              | 120  | 4.7874917 | 180  | 5.1929569  | 240      | 5.4806389          | 300      | 5.7037825          |
| 61         | 4,1108739              | 121  | 4.7957905 | 181  | 5.1984970  | 241      | 5.4847969          | 301      | 5.7071103          |
| 62         | 4.1271344              | 122  | 4.8040210 | 182  | 5.2040069  | 242      | 5.4889377          | 302      | 5.7104270          |
| 63         | 4.1431347              | 123  | 4.8121844 | 183  | 5.2094862  | 243      | 5.4930614          | 303      | 5.7137328          |
| 6.1        | 4.1588831              | 124  | 4.8202816 | 184  | 5.2149358  | 244      | 5.4971682          | 304      | 5.7170277          |
| 65         | 4.1743873              | 125  | 4.8283137 | 185  | 5.2203558  | 245      | 5.5012582          | 305      | 5 7203118          |
| 66         | 4.1896547              | 126  | 4.8362819 | 186  | 5.2257467  | 246      | 5.5053315          | 306      | 5.7235851          |
| 67         | 4.2046926              | 127  | 4.8441871 | 187  | 5.2311086  | 247      | 5.5093883          | 307      | 5.7268477          |
| 68         | 4.2195077              | 128  | 4.8520308 | 188  | 5.2364420  | 248      | 5.5134287          | 308      | 5.7300998          |
| 69         | 4.2341065              |      | 4.8598124 | 189  | 5.2417470  | 249      | Y Company          | 309      | 5.7933413          |
|            |                        |      |           | ·    |            | ·        |                    | <u> </u> |                    |
|            |                        |      |           |      |            |          | •                  |          | 1                  |

TABLE LIV.
HYPERBOLIC LOGARITHMS.

| S10   S.7965723   S70   S.9135080   430   6.0637852   490   6.1944054   550   6.309183   511   5.7997929   371   5.9162921   431   6.0661081   431   6.1964441   551   6.3117948   431   5.7936023   372   5.9185939   432   6.0636925   492   6.1094787   525   6.3135450   4315   5.7462092   373   5.912784   433   6.0707937   495   6.2003092   533   6.313550   6.313550   4315   5.7527362   375   5.91269260   435   6.0753469   495   6.2003092   533   6.313550   6.313550   4316   5.7527329   575   5.9126925   436   6.0776422   496   6.2005739   5.56   6.3926783   4316   5.752732   436   6.0776422   496   6.2005739   5.56   6.3926783   4318   5.7620514   373   5.912652   437   6.0799382   497   6.2085900   557   6.9226632   4318   5.7626314   373   5.9127934   441   6.0890449   499   6.2125061   559   6.32461495   499   5.9126001   559   6.32461495   499   5.9126001   559   6.32461495   499   5.9126001   559   6.32461495   499   5.9126001   559   6.32461495   499   5.9126001   559   6.32461495   499   5.9126001   559   6.32461495   499   5.9126001   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2125061   559   6.32461495   499   6.2225061   559   6.32461495   499   6.2225061   559   6.32461495   499   6.2225061   559   6.32461495   499   6.2225061   559   6.32461495   499   6.2225061   559   6.32461495   499   6.2225061   559   6.325641495   499   6.2225061   559   6.325641495   499   | Num | Hyp. Log.   | Num. | Hyp. Log.         | Num.      | Hyp. Log. | Num.     | Hyp. Log.   | Num.   | Hyp. Log.   |
|--|-----|-------------|------|-------------------|-----------|-----------|----------|-------------|--------|-------------|
| S11   5.7397999   S71   5.9169091   S13   6.0961081   491   6.1964441   551   6.3117948   S13   5.7429392   S72   5.9189891   S73   5.925784   S73   5.925784   S73   6.0730475   S73   G.2023355   S73   G.3171647   S73   S75  | 310 | 5 7965799   |      |                   | 490       | 6 0637859 | 490      | 6 1044054   | 550    | 6 3000189   |
| S12   5.7450392   S72   5.918939   439   6.0684256   492   6.1934787   552   6.3135490   314   5.746392   S73   5.9915784   433   6.0707377   499   6.2905092   553   6.3135490   315   5.7532796   S75   5.9915784   435   6.0753400   495   6.2905739   556   6.3171647   316   5.7552796   S75   5.9915891   496   6.0753400   495   6.2905739   556   6.3189681   317   5.7589014   376   5.9915891   496   6.0753400   495   6.2905739   556   6.3127683   318   5.753614   376   5.9915891   496   6.0753400   497   6.2958900   557   6.3225632   319   5.765191   379   5.9515932   439   6.0844994   499   6.2105001   559   5.3261495   391   5.765191   379   5.9515932   439   6.0844994   499   6.2105001   559   5.3261495   392   5.7745515   382   5.9154306   442   6.0867747   500   6.2169001   560   6.33257209   325   5.775515   382   5.9154306   442   6.091809   502   6.2169001   562   6.3315018   323   5.7807433   384   5.9306426   444   6.0958946   504   6.222573   504   6.3350543   325   5.7888974   336   5.9558934   446   6.0958946   504   6.222573   504   6.3350543   336   5.7808974   336   5.9558934   446   6.1008190   506   6.225387   566   6.3385941   338   5.7950078   388   5.965193   449   6.1007299   500   6.223573   506   6.3385941   508   5.9959939   449   6.1007299   509   6.2234384   568   6.3421914   508   |     |             |      |                   |           |           |          |             |        |             |
| \$13   \$.7462092   \$73   \$.9915784   \$43   \$6.0707377   \$495   \$6.2023535   \$55   \$6.3135590   \$15   \$5.7525796   \$75   \$5.946290   \$43   \$6.07059460   \$495   \$6.2023535   \$55   \$6.3136981   \$16   \$5.7537492   \$375   \$5.992690   \$48   \$6.07059460   \$495   \$6.2023535   \$55   \$6.3189881   \$316   \$5.7537492   \$375   \$5.9926920   \$496   \$6.0705492   \$497   \$6.2035357   \$55   \$6.3189881   \$318   \$5.7620514   \$378   \$5.892452   \$437   \$6.07059492   \$497   \$6.2035050   \$557   \$6.3189881   \$318   \$5.7620514   \$378   \$5.892452   \$438   \$6.082819   \$499   \$6.2125061   \$559   \$6.3261495   \$319   \$5.7651911   \$379   \$5.975362   \$439   \$6.0844994   \$499   \$6.2125061   \$559   \$6.3261495   \$391   \$5.7651911   \$379   \$5.975362   \$439   \$6.084774   \$500   \$6.2165061   \$559   \$6.3261495   \$391   \$5.776529   \$383   \$5.9180350   \$446   \$6.0857747   \$500   \$6.2165061   \$501   \$5.929598   \$392   \$5.776529   \$383   \$5.9180350   \$443   \$6.093509   \$502   \$6.2185061   \$561   \$6.3835148   \$392   \$5.78688944   \$386   \$5.9858944   \$446   \$6.0858946   \$504   \$6.223573   \$561   \$6.3350148   \$392   \$5.78688944   \$386   \$5.9858944   \$446   \$6.0858946   \$504   \$6.223573   \$564   \$6.3350143   \$392   \$5.78688944   \$386   \$5.9858913   \$445   \$6.0080743   \$505   \$6.2245381   \$565   \$6.33859143   \$392   \$5.7960578   \$388   \$5.9858913   \$446   \$6.1075299   \$507   \$6.2235173   \$567   \$6.3495893   \$393   \$5.7960578   \$389   \$5.9868167   \$450   \$6.1075299   \$509   \$6.2235480   \$567   \$6.3453894   \$393   \$5.7963967   \$450   \$6.111678   \$511   \$6.2363696   \$571   \$6.3478892   \$393   \$5.7960578   \$393   \$5.986961   \$457   \$6.111678   \$511   \$6.2363696   \$571   \$6.3478892   \$393   \$5.9805493   \$395   \$5.9889614   \$459   \$6.1126798   \$500   \$6.2235877   \$567   \$6.3458894   \$393   \$5.986967   \$457   \$6.111678   \$513   \$6.249273   \$579   \$6.345189   \$393   \$5.986967   \$457   \$6.111678   \$511   \$6.2363696   \$571   \$6.345899   \$395   \$5.988968   \$457   \$6.1186927   \$518   \$6.2492773   \$576   \$6.356887   \$586   \$5.988987   \$457   \$6.126797   \$518   \$6.2493775 |     |             |      |                   |           |           |          |             |        |             |
| 314   5.7493990   374   5.9.442378   494   6.0790447   494   6.9023355   554   6.3171647     316   5.7557429   376   5.9029990   485   6.0757840   495   6.9016378   555   6.31806781     317   5.7589018   577   5.9792432   417   6.079391   497   6.2265790   558   6.3297681     318   5.7620514   378   5.5.89421   488   6.0822189   499   6.2169001   558   6.3294589     319   5.765191   375   5.9572532   488   6.0822189   499   6.2169001   558   6.3294599     320   5.768210   380   5.9521713   440   6.0867747   500   6.2169001   559   6.3261498     321   5.7714411   381   5.947094   441   6.0890449   501   6.2169001   550   6.3297898     322   5.774515   382   5.9154206   442   6.091809   502   6.2169001   569   6.339799     323   5.7808374   383   5.9150420   444   6.0895489   504   6.2223763   564   6.335041     323   5.7808374   386   5.952833   446   6.0858246   504   6.2223763   564   6.335041     324   5.7807435   383   5.952833   445   6.080743   505   6.226387   566   6.335041     325   5.7888374   386   5.952833   445   6.080743   505   6.226387   566   6.335041     328   5.7930136   388   5.9610053   448   6.1041932   508   6.2203902   567   6.345834     329   5.7960578   389   5.9661467   450   6.109476   510   6.2364107   570   6.345834     320   5.7990927   390   5.9661467   450   6.109476   510   6.2364107   570   6.345834     321   5.801140   394   5.9763309   445   6.118097   513   6.2405369   571   6.3478892     323   5.801140   395   5.978696   456   6.111678   511   6.2365669   571   6.3478892     323   5.801140   395   5.978696   456   6.111678   511   6.2365669   571   6.3478892     323   5.805040   395   5.978696   456   6.111678   517   6.2402933   579   6.350867     324   5.811140   395   5.978696   456   6.1116072   516   6.241608   575   6.3548700     325   5.886040   395   5.988468   456   6.1200502   519   6.2519000   579   6.351802     326   5.8879897   496   6.1005074   496   6.1205075   596   6.2488500   579   6.351802     327   5.886040   399   5.988686   466   6.1205775   596   6.   |     |             |      |                   |           |           | 1 1      |             |        |             |
| 315   5.752796   375   5.956900   435   6.0753460   495   6.2901378   575   6.3199681   316   5.7537422   376   5.950591   436   6.0776422   496   6.2905130   556   6.3905391   518   5.7635011   378   5.9505232   437   6.0793932   497   6.2905900   557   6.3225632   518   5.7635011   378   5.9505232   438   6.0822189   498   6.2100001   558   6.324393   5.7635111   378   5.9505232   438   6.0822189   499   6.2100001   558   6.324393   329   5.7635111   378   5.9175932   439   6.0824189   499   6.2100001   558   6.324393   329   5.7745515   382   5.9154200   442   6.0807449   490   6.2169061   561   6.327588   329   5.7745515   382   5.9154200   442   6.083049   501   6.2169061   561   6.327588   323   5.7776523   383   5.9180350   443   6.083698   503   6.2205022   533   6.3332796   323   5.7868974   386   5.958574   446   6.080743   505   6.2245381   565   6.3368271   335   5.7868974   386   5.958574   446   6.080743   505   6.2245381   565   6.3368271   337   5.7896078   389   5.9665793   448   6.1070295   509   6.235387   566   6.3368271   339   5.7960578   389   5.9665793   449   6.1070295   509   6.235387   566   6.3368271   339   5.7960578   389   5.966768   450   6.1070295   509   6.234480   569   6.3438804   330   5.7960878   359   5.958574   445   6.1070295   509   6.234480   569   6.3438804   330   5.7960878   359   5.966768   455   6.116682   512   6.233396   571   6.3456364   330   5.7960878   359   5.966768   455   6.116682   512   6.233396   571   6.3456364   333   5.8061450   392   5.9716918   452   6.116682   512   6.233396   571   6.3456364   333   5.8061425   393   5.980563   457   6.116682   512   6.233396   577   6.353808   335   5.806089   397   5.980563   457   6.126693   511   6.2475700   511   6.353696   535   5.988978   535   5.988986   457   6.126693   512   6.2353805   578   6.353639   335   5.806089   398   5.9805630   454   6.1180972   514   6.2416660   575   6.356793   336   5.806089   398   5.9805630   457   6.126693   519   6.2275000   518   6.364750   335   5.886871   398   5.   |     |             |      |                   |           |           |          |             |        |             |
| 316   5.7557492   376   5.993891   438   6.0776492   496   6.9063739   5.76   6.3937683   5.7651911   379   5.976392   437   6.0783932   497   6.295300   557   6.3925632   319   5.7651911   379   5.975362   439   6.0844994   499   6.2125061   538   6.324359)   320   5.7683910   380   5.976372   439   6.0844994   499   6.2125061   558   6.324359)   320   5.7683910   380   5.963193   440   6.080744   501   6.2169061   561   6.3297209   322   5.7714411   381   5.9127904   441   6.0890449   501   6.2169061   561   6.3297209   322   5.7714515   382   5.9154206   443   6.093696   503   6.228500   563   6.3327988   323   5.7775282   383   5.9180354   446   6.0935969   503   6.2225763   564   6.33297299   324   5.7807455   384   5.9506420   443   6.0958266   504   6.2225763   566   6.3352974   535   5.9583944   446   6.093696   504   6.2225763   566   6.3352974   536   5.7868974   386   5.9558374   446   6.1003190   506   6.2265367   566   6.3358941   5.9506420   447   447   6.1025386   507   6.2285367   566   6.3355943   5.7960578   385   5.9681065   348   6.1070229   509   6.2324480   569   6.34282480   539   5.9651660   539   5.9681667   459   6.1070229   509   6.2324480   569   6.34282480   549   6.34282480   56   |     |             |      |                   |           |           |          |             |        |             |
| 318   5.7589018   577   5.9789245   439   6.0892180   499   6.2108001   538   6.3924529   5.7651911   379   5.975362   439   6.0844991   499   6.210801   559   0.3261495   539   5.7651911   379   5.975362   439   6.0844991   499   6.2108061   559   0.3261495   539   5.765391   5.7652   |     |             |      |                   |           |           |          |             |        |             |
| \$19   \$5.7651911   \$379   \$5.96.8949   \$48   \$6.0892189   \$499   \$6.2159061   \$559   \$6.3261495     \$320   \$5.7651911   \$370   \$5.9175362   \$439   \$6.0844994   \$499   \$6.2159061   \$559   \$6.3261495     \$321   \$5.7714411   \$81   \$5.9127994   \$41   \$6.0867747   \$500   \$6.2146981   \$561   \$6.327598     \$322   \$5.7714511   \$82   \$5.9127994   \$41   \$6.0807449   \$501   \$6.2169061   \$561   \$6.3297598     \$323   \$5.776522   \$383   \$5.9189350   \$442   \$6.0913099   \$503   \$6.2285092   \$563   \$6.3315018     \$323   \$5.7868974   \$364   \$5.9306429   \$445   \$6.093598   \$503   \$6.2245781   \$565   \$6.3332798     \$325   \$5.7889322   \$355   \$5.932943   \$445   \$6.093598   \$503   \$6.2245781   \$565   \$6.3332798     \$326   \$5.7895902   \$375   \$5.938474   \$446   \$6.093598   \$503   \$6.2245781   \$565   \$6.3335914     \$327   \$5.789902   \$375   \$5.938474   \$447   \$6.1003190   \$506   \$6.2225763   \$566   \$6.3335914     \$328   \$5.7930136   \$388   \$5.9610053   \$449   \$6.1072593   \$507   \$6.2285170   \$566   \$6.3345804     \$329   \$5.7960578   \$389   \$5.9687076   \$449   \$6.1070229   \$509   \$6.2324480   \$569   \$6.3345804     \$330   \$5.9651950   \$99   \$5.9788958   \$456   \$6.1092476   \$510   \$6.2344107   \$570   \$6.345604     \$331   \$5.8021184   \$391   \$5.9687076   \$456   \$6.1116783   \$511   \$6.2363696   \$776   \$6.345604     \$331   \$5.803195   \$995   \$5.9788958   \$456   \$6.1292974   \$515   \$6.2441669   \$575   \$6.3543700     \$333   \$5.8061495   \$995   \$5.9788958   \$456   \$6.1292974   \$515   \$6.2441669   \$575   \$6.354700     \$334   \$5.811140   \$394   \$5.9768599   \$456   \$6.1156929   \$518   \$6.2499752   \$576   \$6.3556790     \$345   \$5.889456   \$400   \$5.9936614   \$456   \$6.1292974   \$515   \$6.2441669   \$575   \$6.354700     \$346   \$5.886450   \$400   \$5.9936614   \$456   \$6.1292974   \$515   \$6.2573009   \$576   \$6.3550730     \$346   \$5.8864517   \$406   \$5.993661   \$466   \$6.1292974   \$515   \$6.2573009   \$576   \$6.3550730     \$346   \$5.8864517   \$406   \$5.993661   \$466   \$6.1292975   \$506   \$6.2573098   \$576   \$6.3550730   \$576   \$6.3550730   \$576   \$6.35   |     |             |      |                   |           |           |          |             |        |             |
| 319   5.7651911   379   5.9.75362   439   6.0844994   499   6.2125061   559   6.3261495  |     |             |      |                   |           |           |          |             |        |             |
| 320   5.7688210   380   5.9481713   440   6.0867747   500   6.2146081   550   6.3279688   321   5.7714411   381   5.9127994   419   6.0890149   501   6.2169081   561   6.3297209   322   5.7746515   382   5.915400   419   6.0913095   502   6.2186001   562   6.3135018   323   5.7776523   383   5.9180350   443   6.0935698   503   6.2205302   563   6.3332796   324   5.7807453   384   5.9506426   443   6.0958246   504   6.2225763   564   6.3332796   325   5.7889322   385   5.932943   445   6.098743   505   6.2245781   565   6.33352798   326   5.7868974   336   5.9558874   447   6.1063190   506   6.2265367   566   6.3335918   328   5.7930136   388   5.9610053   449   6.107029   509   6.2224780   567   6.345804   398   5.7930136   388   5.9635793   449   6.107029   509   6.2324480   569   6.342814   589   5.7950978   389   5.9687076   451   6.1111678   511   6.2336966   571   6.345804   589   5.8051950   292   5.9712618   452   6.1158921   513   6.2402738   573   6.3458034   5.8111410   394   5.5763509   455   6.1158921   513   6.2402738   573   6.356887   334   5.8111410   394   5.5763509   455   6.1158921   513   6.2402738   573   6.356887   335   5.8058089   397   5.983963   457   6.1246834   517   6.344569   575   6.3545700   336   5.805190   399   5.9864520   458   6.1292978   516   6.241669   575   6.3561079   5378423   538   5.8200459   399   5.9889614   459   6.129298   516   6.257670   581   6.3647503   543   5.885046   400   5.9936454   466   6.1393890   521   6.257670   581   6.3647503   583   5.8850719   409   6.0137152   469   6.1240374   526   6.253515   583   6.361872   534   6.866881   583   583   6.366882   583   6.366882   583   6.868823   416   6.016572   470   6.154588   520   6.2535983   586   6.3761928   535   5.885304   416   6.0185932   471   6.148581   531   6.2476760   588   6.366872   466   6.1016772   470   6.154581   531   6.2476760   588   6.3668732   412   6.0016372   470   6.154581   531   6.276630   588   6.3668823   416   6.0086823   476   6.154583   531   6.276630   588   6.3678030   |     |             |      |                   |           | 1         |          |             |        |             |
| 321   5.771441   381   5.9427994   441   6.0890149   501   6.216901   502   6.3815018   323   5.7776525   382   5.9154206   441   6.0895898   503   6.2203902   503   6.3315018   323   5.7776525   383   5.9180350   443   6.0935998   503   6.2203902   503   6.3332796   503   5.776525   384   5.9306496   444   6.0958946   504   6.222763   564   6.3332796   505   5.2245781   505   6.3332796   505   5.2245781   505   6.3352796   505   5.2245781   505   6.336257   505   5.2245781   505   6.336257   505   5.2245781   505   6.336257   505   5.2245781   505   6.336257   505   5.2245781   505   6.336257   505   5.2245781   505   6.336257   505   5.2245781   505   6.336257   505   5.2245781   505   6.336257   505   5.2245781   505   6.336257   505   5.2245781   505   6.336257   505   5.2245781   505   6.336257   505   5   |     |             |      | 3.9375302         | <b></b> . | 0.0011331 | 433      | 0,2123001   |        |             |
| 322   5.7745515   382   3.9154206   442   6.0915099   502   6.2186001   502   6.3312018   323   5.7776523   383   5.9180330   443   6.093598   503   6.2203793   564   6.3230743   325   5.7807495   384   5.9306426   444   6.0980743   505   6.2245381   565   6.3330543   325   5.7808974   386   5.955874   446   6.1003190   506   6.2255367   566   6.3330543   327   5.789692   387   5.9584247   447   6.1023596   507   6.2285310   567   6.340393   328   5.7930136   388   5.9635783   449   6.1070229   509   6.2324480   569   6.343840   329   5.7960578   389   5.9635783   449   6.1070229   509   6.2324480   569   5.443840   329   5.799027   390   5.9661467   450   6.109476   510   6.2344107   570   6.3456364   331   5.8021184   391   5.9687076   451   6.1111673   511   6.2363686   571   6.3473890   333   5.8081425   393   5.973896   453   6.115892   512   6.2233246   572   6.3491390   333   5.8081425   393   5.973896   453   6.115892   512   6.2233246   572   6.3491390   335   5.8141905   394   5.973896   455   6.1180972   514   6.2422233   574   6.3451894   336   5.8171112   396   5.9814142   456   6.1292492   516   6.241669   575   6.3543700   336   5.8171112   396   5.9814142   456   6.1292492   516   6.241669   575   6.3543700   336   5.817112   396   5.9814142   456   6.1292492   518   6.249169   575   6.3543700   339   5.8930630   397   5.9839363   457   6.1246834   517   6.2450429   577   6.3578423   338   5.8306001   399   5.9889614   459   6.1290502   518   6.2491725   578   6.3543704   341   5.8466417   404   6.0014149   464   6.1833990   521   6.2557500   581   6.3674704   342   5.8466417   404   6.0068871   465   6.1820892   578   6.2539395   586   6.3731819   347   5.8463844   405   6.0088871   465   6.1463923   537   6.2533905   588   6.3761902   531   5.8664681   415   6.028660   416   6.018593   417   6.1546384   531   6.2476203   586   6.378194   439   5.8650713   409   6.0088871   465   6.1463928   537   6.2533905   588   6.3761924   538   5.860681   411   6.018593   411   6.018593   411   6.018593  |     | 5.7683210   | 380  | 5.9401713         | 440       | 6.0867747 | 500      | 6.2146081   | 550    | 6.3279368   |
| 392   5.7776523   383   5.9180330   443   6.0935698   503   6.2903902   563   6.3939705   394   5.7807435   384   5.9306426   444   6.0938946   504   6.2923735   504   6.3930543   385   5.9539343   445   6.0980743   505   6.29245381   505   6.3938925   395   5.7838932   385   5.9538943   445   6.0980743   505   6.29245381   505   6.3938925   396   5.7868974   386   5.9558974   446   6.1003190   506   6.2265367   566   6.3938925   507   6.29285110   567   6.3460593   398   5.7980502   388   5.9610053   448   6.1047932   508   6.2934814   568   6.3421914   399   5.7960578   389   5.9663793   449   6.1070229   509   6.2324480   569   6.3438914   391   5.9687076   451   6.1111673   511   6.2365666   571   6.347892   392   5.8051950   392   5.9719618   459   6.1115682   512   6.2233466   571   6.347892   393   5.8681425   393   5.978369   455   6.1156921   513   6.292673   574   6.347892   393   5.8681425   393   5.978369   455   6.1158921   513   6.2402738   574   6.352694   535   5.8111410   394   5.96763509   455   6.1189971   513   6.2402738   574   6.3526934   535   5.8111410   394   5.96763509   455   6.1189971   513   6.240169   575   6.3543700   335   5.8111410   394   5.96763509   455   6.1189971   515   6.2411669   575   6.3543700   337   5.8200829   397   5.983968   455   6.1290502   519   6.2519039   577   6.356393   457   6.1246894   517   6.2480429   577   6.3574700   337   5.8200829   397   5.983968   459   6.1290502   519   6.2519039   577   6.3519029   398   5.9364520   458   6.1290502   519   6.2519039   579   6.3519029   398   5.9364520   458   6.1290502   519   6.2519039   579   6.3519029   394   5.883965   459   6.1290502   519   6.2519039   579   6.3519029   394   5.883864   459   6.1290502   519   6.2519039   579   6.3519029   394   5.885807   403   5.9989366   465   6.1290502   519   6.2519039   579   6.3519029   519   6.257500   581   6.366700   581   6.366700   581   |     |             |      |                   |           |           |          |             |        |             |
| 394   5.7807495   384   5.9306496   444   6.0958946   504   6.9292763   564   6.3330543   395   5.7868974   386   5.9558374   446   6.1003190   506   6.2265367   566   6.33635971   377   5.7899602   387   5.9584247   447   6.1023596   507   6.2265367   566   6.3985971   388   5.960583   448   6.1070329   509   6.232480   567   6.3463593   589   5.9635793   449   6.1070329   509   6.232480   569   6.3438804   393   5.7990927   390   5.9661467   450   6.1070329   509   6.232480   569   6.3458804   393   5.802184   391   5.9687076   451   6.111678   511   6.235696   571   6.3473892   393   5.805189   3.9567076   451   6.111678   511   6.235696   571   6.3473892   393   5.8081425   393   5.9738936   453   6.115892   512   6.2333246   572   6.3491300   333   5.8081425   393   5.9738936   453   6.115892   512   6.2233246   572   6.3491300   333   5.8081425   393   5.9738936   453   6.115892   514   6.2441669   575   6.356097   337   5.8200829   397   5.9839363   457   6.124684   457   6.124684   457   6.2449752   578   6.3578423   338   5.8230459   398   5.9834520   458   6.1290597   451   6.241669   575   6.3578423   339   5.82300459   398   5.98364520   458   6.12905902   519   6.2257500   581   6.361007   593   5.8850001   399   5.9889814   459   6.1290502   519   6.2257500   581   6.3610025   594   5.846617   402   5.999636   459   6.1235780   578   6.356094   544   6.1335049   5.846617   402   5.9996814   459   6.1235740   525   6.2535102   578   6.361002   542   6.3636001   599   5.9889814   459   6.12357500   581   6.3610025   581  |     |             |      | 5.9454206         | 442       | 6.0913099 | 502      | 6.2186001   | 562    | 6.3315018   |
| 395   5.7898952   385   5.9532493   445   6.0980743   505   6.2245381   565   6.3368257   396   5.7808974   336   5.9558374   446   6.1003190   506   6.2265367   566   6.3368941   327   5.7899602   387   5.958874   447   6.1025386   507   6.22653167   566   6.3485941   328   5.7930136   388   5.9610053   448   6.1047932   508   6.2934814   568   6.3421214   539   5.7960578   389   5.9685793   449   6.1070229   509   6.2934480   569   6.343804   391   5.892184   391   5.9687076   451   6.111673   511   6.2363696   571   6.3473892   5.8051950   392   5.9712618   452   6.1136822   512   6.2333846   571   6.3473892   5.8051950   393   5.9763509   454   6.118692   512   6.2333846   572   6.3568378   334   5.8111410   394   5.9763509   454   6.118692   514   6.242233   574   6.356837   335   5.8141905   395   5.978358   455   6.1202974   515   6.241669   573   6.356857   335   5.820459   397   5.983963   457   6.1246894   516   6.241669   576   6.3543700   336   5.820459   397   5.983963   457   6.126694   517   6.2480429   577   6.356307   5.8200459   398   5.9364520   458   6.1202974   515   6.2490752   578   6.356307   337   5.820001   599   5.9889614   459   6.1206902   518   6.2499752   578   6.3563025   454   6.180602   518   6.2499752   578   6.3563025   454   6.180602   518   6.2499752   578   6.3653025   454   6.180602   518   6.2499752   578   6.3653025   454   6.180602   518   6.2499752   578   6.3653025   454   6.180602   518   6.2499752   578   6.3653025   454   6.180602   518   6.2499752   578   6.3653025   454   6.180602   518   6.2499752   578   6.3653025   458   6.180602   518   6.2499752   578   6.36580281   454   6.365602   454   6.180602   518   6.2499752   578   6.3658020   454   6.180602   518   6.2499752   578   6.3658020   454   6.180602   518   6.2499752   578   6.3658020   454   6.180602   518   6.2499752   578   6.3658020   454   6.180602   518   6.2499752   578   6.3658020   454   6.180602   518   6.2499752   578   6.3658020   518   6.2499752   578   6.3658020   518   6.2499752   578   6   |     |             |      | 5.9480350         | 443       | 6.0935698 | 503      | 6.2205902   | 563    | 6.3332796   |
| 396   5.7808974   386   5.9558574   446   6.1003190   506   6.2265367   566   6.3385941   327   5.7899602   347   5.9584247   447   6.1025396   507   6.2285310   507   6.3405393   598   5.7930136   388   5.9610053   448   6.1047932   508   6.2304814   568   6.3421214   329   5.7960578   389   5.9635793   449   6.1070229   509   6.2324480   569   6.3438804   390   5.7990927   390   5.9661467   450   6.1070229   509   6.2344107   570   6.3456364   331   5.8021184   391   5.9661467   450   6.111678   511   6.2363696   571   6.347892   332   5.8051350   392   5.978996   453   6.1116682   512   6.2383246   572   6.349130   333   5.8061425   393   5.978996   453   6.118692   514   6.2402738   573   6.3508857   334   5.811410   394   5.976359   454   6.1180972   514   6.242233   574   6.352694   535   5.8141305   395   5.978896   456   6.124683   516   6.241669   575   6.354700   336   5.8171112   393   5.984590   456   6.124683   517   6.2440429   575   6.356107   337   5.8200829   397   5.989366   457   6.124684   517   6.2490752   578   6.3578423   538   5.820459   398   5.9364590   448   6.120662   519   6.2519039   579   6.357392   539   5.8260001   399   5.998961   459   6.120562   519   6.2557500   581   6.3647503   542   5.834895   401   5.993961   450   6.1235564   522   6.2557500   581   6.3647503   544   5.846388   406   6.0063592   466   6.1441856   526   6.2557500   581   6.3664704   5.8455444   405   6.008132   467   6.146893   531   6.2459752   586   6.3761903   347   5.846388   406   6.0063592   467   6.146893   531   6.2569308   586   6.376140   545   585604681   413   6.0234476   477   6.1569293   537   6.2579884   589   6.376148   531   6.247603   531   6.2867892   414   6.0014149   464   6.1398846   534   6.2614917   584   6.3661903   547   6.366704   547   548   |     | 5.7807435   | 384  | 5.9306426         | 444       | 6.0958246 | 504      | 6.2225763   | 564    | 6.3350543   |
| 327   5.7899602   387   5.9584247   447   6.1025536   507   6.285110   567   6.3403593   328   5.7990578   389   5.9635793   449   6.1070229   509   6.293410   568   6.342314   588   5.7990578   389   5.9685793   449   6.1070229   509   6.2934480   569   6.3458694   331   5.8021184   391   5.9687076   451   6.1111673   511   6.2536366   571   6.3473892   532   5.8051950   392   5.95687076   451   6.1111673   511   6.2536366   571   6.3473892   533   5.8081425   393   5.9738096   453   6.1156829   512   6.2933246   573   6.3508857   334   5.8111410   394   5.9768509   454   6.1186927   514   6.2422333   574   6.3526394   5.8171112   395   5.98184142   456   6.1262974   515   6.2461669   575   6.3543700   336   5.8171112   395   5.988614   456   6.1262894   517   6.2490752   578   6.355301077   337   5.8200829   398   5.9585614   459   6.12628692   518   6.2499752   578   6.355301077   337   5.8200829   398   5.9864520   458   6.12628692   518   6.2499752   578   6.3553023   339   5.8260001   539   5.988614   459   6.12628692   518   6.2499752   578   6.357303   334   5.8318825   401   5.9939614   461   6.1333995   521   6.2557500   581   6.3647503   342   5.8346107   402   5.9904521   402   6.13535649   522   6.2558288   380   6.3630281   341   5.8318825   401   5.9939614   461   6.1333995   521   6.2557500   581   6.3647503   342   5.8346107   402   5.9904521   402   6.1353649   522   6.2558268   582   6.3664704   345   5.8464848   406   6.008871   462   6.135267   522   6.2576676   582   6.3668704   345   5.8464848   406   6.008873   465   6.1441856   526   6.2553012   586   6.3681872   346   5.8652025   406   6.008873   467   6.1468293   527   6.257900   587   6.3763048   346   5.8652025   406   6.008873   467   6.1468293   527   6.2672005   587   6.3763248   356   5.866861   410   6.0034476   477   6.1652973   536   6.2971905   537   6.3850248   356   5.866812   412   6.002633   447   6.1664179   536   6.2971905   537   6.3850248   536   5.866812   412   6.002633   447   6.166617   538   6.2971905   503  |     | 5.7838252   | 385  | 5.9532433         | 445       | 6.0980743 | 505      | 6.2245581   | 565    | 6.3368257   |
| 328   5.7930136   388   5.9610053   448   6.1047932   508   6.2934184   568   6.3421914   329   5.7960578   389   5.9635793   449   6.1070229   509   6.2324480   569   6.3458044   583   5.8921184   391   5.9681676   450   6.1011673   511   6.2363696   571   6.3473892   532   5.8051950   392   5.9712618   452   6.1156822   512   6.2333246   572   6.3491300   533   5.8081495   393   5.9738096   453   6.1158921   513   6.2462733   573   6.3491300   533   5.8081495   393   5.9738096   453   6.1158921   513   6.2402738   573   6.3508857   334   5.8111410   394   5.9768509   454   6.1180972   514   6.2422233   574   6.3526294   335   5.8171112   396   5.9788858   455   6.1292974   515   6.2414660   575   6.3543700   336   5.8171112   396   5.9839563   457   6.1246893   517   6.2460499   577   6.3543700   339   5.8260001   599   5.9889614   459   6.1260892   518   6.2499752   578   6.35593733   5.8260001   599   5.9889614   459   6.1205002   519   6.2519039   579   6.3615025   532   5.8348107   402   5.9939614   459   6.1205002   519   6.2519039   579   6.3615025   5342   5.8318825   401   5.9939614   459   6.1205002   519   6.2576676   582   6.364704   343   5.8377304   403   5.9989366   463   6.1877271   523   6.2553818   583   6.3681872   344   5.846167   404   6.0014149   464   6.139846   524   6.2576676   582   6.3673608   345   5.8453444   405   6.008182   467   6.146893   524   6.2576676   582   6.367808   345   5.8453444   405   6.0088132   467   6.146893   524   6.2619917   584   6.369910   584   5.8520202   408   6.0112672   468   6.148683   528   6.2569963   588   6.3767269   345   5.85607862   411   6.018592   471   6.1560979   532   6.276676   582   6.3851840   535   5.8664881   413   6.0234476   473   6.1560979   532   6.276676   589   6.385066   5.8664881   413   6.0234476   473   6.1560979   532   6.2766973   596   6.3851940   535   5.8664881   413   6.0234476   473   6.1560979   532   6.2766973   596   6.3851940   535   5.8664881   413   6.0234476   473   6.1560979   532   6.2769881   597   6.385194   |     | 5.7868974   | 386  | <b>5.9</b> 558874 | 446       | 6.1003190 | 506      | 6.2265367   | 566    | 6.3385941   |
| 399   5.7960578   389   5.9635793   449   6.1070229   509   6.2324480   569   6.3458804  |     | 5.7899602   | 387  | 5.9584247         | 447       | 6.1025586 | 507      | 6.2285110   | 567    | 6.3403593   |
| 339   5.7960578   389   5.9635793   449   6.1070229   509   6.2324480   569   6.345804   | 328 | 5.7930136   | 388  | 5.9610053         | 448       | 6.1047932 | 508      | 6.2304814   | 568    | 6.3421214   |
| S31   5.8021184   S31   5.9687076   451   6.1114673   511   6.2363696   571   6.3478892   532   5.8051350   592   5.9712618   452   6.1136822   512   6.2333246   572   6.33491390   533   5.8081425   593   5.9738096   454   6.1180972   514   6.2422233   573   6.3508857   534   5.8111410   394   5.9768509   454   6.1180972   514   6.2422233   574   6.3526294   535   5.8171112   395   5.98184142   456   6.1222974   515   6.2441669   575   6.3545077   537   5.820829   397   5.983963   457   6.1246834   517   6.2441669   575   6.3545077   537   5.820829   397   5.983963   457   6.1246834   517   6.2441669   576   6.3551077   537   5.820829   397   5.983963   457   6.1246834   517   6.2449752   578   6.3557393   539   5.8260001   599   5.9889614   459   6.1290502   519   6.2519039   579   6.3518025   539   5.8280459   398   5.9364520   458   6.1263692   518   6.2499752   578   6.3557393   539   5.8280450   401   5.9939614   461   6.1333980   521   6.2557500   581   6.5647508   542   5.8348107   402   5.9964521   462   6.1355649   522   6.2557500   581   6.5647508   544   5.8463488   406   6.0038871   465   6.1420374   525   6.2639915   583   6.3681872   544   5.8463488   406   6.0088871   465   6.1420374   525   6.2639915   586   6.3733198   547   5.8493248   407   6.0088132   467   6.1463293   527   6.2672005   578   6.3731918   548   5.8529025   408   6.0116772   468   6.146383   586   6.269005   578   6.37516118   536   5.85664681   413   6.0234476   473   6.156939   537   6.2776505   579   6.3851914   5.8607862   411   6.0185932   471   6.1543581   531   6.2747620   591   6.3818160   525   5.8608463   413   6.0234476   473   6.1654179   536   6.2841342   5.99   6.3858594   535   5.8773388   416   6.0426328   477   6.1657165   537   6.2876906   539   6.3955998   538   5.8805330   416   6.0426328   481   6.1654179   536   6.2841342   596   6.3905998   5.8853224   419   6.0234476   473   6.1654179   536   6.2841342   596   6.3905998   5.8853224   419   6.0426328   481   6.1767673   546   6.2841342   596   6.390599   | 329 | 5.7960578   | 389  |                   | 449       |           | 509      | 6,2324480   | 569    | 6.3438804   |
| S31   5.8021184   S31   5.9687076   451   6.1114673   511   6.2363696   571   6.3478892   532   5.8051350   592   5.9712618   452   6.1136822   512   6.2333246   572   6.33491390   533   5.8081425   593   5.9738096   454   6.1180972   514   6.2422233   573   6.3508857   534   5.8111410   394   5.9768509   454   6.1180972   514   6.2422233   574   6.3526294   535   5.8171112   395   5.98184142   456   6.1222974   515   6.2441669   575   6.3545077   537   5.820829   397   5.983963   457   6.1246834   517   6.2441669   575   6.3545077   537   5.820829   397   5.983963   457   6.1246834   517   6.2441669   576   6.3551077   537   5.820829   397   5.983963   457   6.1246834   517   6.2449752   578   6.3557393   539   5.8260001   599   5.9889614   459   6.1290502   519   6.2519039   579   6.3518025   539   5.8280459   398   5.9364520   458   6.1263692   518   6.2499752   578   6.3557393   539   5.8280450   401   5.9939614   461   6.1333980   521   6.2557500   581   6.5647508   542   5.8348107   402   5.9964521   462   6.1355649   522   6.2557500   581   6.5647508   544   5.8463488   406   6.0038871   465   6.1420374   525   6.2639915   583   6.3681872   544   5.8463488   406   6.0088871   465   6.1420374   525   6.2639915   586   6.3733198   547   5.8493248   407   6.0088132   467   6.1463293   527   6.2672005   578   6.3731918   548   5.8529025   408   6.0116772   468   6.146383   586   6.269005   578   6.37516118   536   5.85664681   413   6.0234476   473   6.156939   537   6.2776505   579   6.3851914   5.8607862   411   6.0185932   471   6.1543581   531   6.2747620   591   6.3818160   525   5.8608463   413   6.0234476   473   6.1654179   536   6.2841342   5.99   6.3858594   535   5.8773388   416   6.0426328   477   6.1657165   537   6.2876906   539   6.3955998   538   5.8805330   416   6.0426328   481   6.1654179   536   6.2841342   596   6.3905998   5.8853224   419   6.0234476   473   6.1654179   536   6.2841342   596   6.3905998   5.8853224   419   6.0426328   481   6.1767673   546   6.2841342   596   6.390599   | 990 | £ 7000007   | 900  | £ 0001.405        |           | C 103047C | 510      | C 0044107   | 570    | E 0450004   |
| S32   5.8051950   S92   5.9712618   452   6.1136822   512   6.2333246   572   6.3491390   533   5.8081425   S93   5.9738096   453   6.1158991   513   6.2402738   573   6.3308857   534   5.8111410   S94   5.9763509   445   6.1188991   513   6.2402738   574   6.3526294   S35   5.8141305   S95   5.9788858   455   6.1202974   515   6.241669   575   6.3543700   S36   5.8171112   S95   5.9814142   456   6.1224928   516   6.2461068   576   6.3561077   S37   5.8200829   S97   5.9839363   457   6.1246834   517   6.2441069   575   6.351077   S37   5.8200829   S97   5.9839363   457   6.1246834   517   6.2441069   576   6.3510423   S38   5.8200459   S98   5.9864520   458   6.1263692   518   6.2499752   578   6.3578423   S38   5.8260001   S99   5.9889614   459   6.1290502   519   6.2519039   579   6.3618025   S42   5.8348107   402   5.9939614   461   6.1333989   521   6.257500   581   6.5647508   S42   5.8348107   402   5.9939614   462   6.1353649   522   6.257500   581   6.5647508   S42   5.8348107   402   5.9989366   463   6.1377271   523   6.2553815   583   6.3664704   S34   5.8406417   404   6.014149   464   6.198846   526   6.2613012   586   6.3753184   5.8463438   406   6.008871   465   6.1420374   525   6.2633012   586   6.3753184   5.8463438   407   6.0088132   467   6.1420374   525   6.2633012   586   6.3753194   5.8453984   407   6.0088132   467   6.1420374   525   6.2653012   586   6.3753194   5.8550719   409   6.0137152   469   6.1505028   529   6.2709884   589   6.376496   535   5.8636312   412   6.0216233   472   6.1569790   532   6.2766435   599   6.385066   535   5.8636312   412   6.0284785   475   6.1634179   536   6.276663   599   6.385066   5.8749307   416   6.0284785   475   6.1634179   536   6.276663   599   6.3952966   5.885614   5.8865330   418   6.0354814   478   6.169617   538   6.2978967   595   6.3859968   5.8850330   418   6.0354814   478   6.169617   538   6.2978980   599   6.3952908   559   5.8838224   419   6.0378709   479   6.1717006   539   6.2971098   603   6.40019772   486   6.1800167  |     |             |      |                   | 1         |           |          |             | 11 1   | 1           |
| S33   5.8081425   S93   5.9738096   453   6.1158991   513   6.2402738   573   6.3508857   534   5.8111410   S94   5.9763509   454   6.1180972   514   6.2422233   574   6.3526294   515   6.2416068   575   6.3563700   S36   5.8171112   S95   5.9783858   455   6.1202974   515   6.2416068   576   6.3561077   S37   5.8200829   S97   5.9839363   457   6.1246834   517   6.2480429   578   6.3578423   S38   5.8230459   S95   5.98536520   458   6.1266834   517   6.2480429   578   6.3578423   S39   5.8260001   S99   5.9889614   459   6.1290502   519   6.2519039   579   6.3619025   S40   5.818825   401   5.9939614   461   6.133398   5.826904   402   5.9939614   461   6.133398   5.826940   402   5.994521   462   6.1355649   522   6.2557500   581   6.5647508   542   5.8348107   402   5.994521   462   6.1355649   522   6.2557500   581   6.5647508   542   5.8348107   402   5.994521   462   6.1355649   522   6.2557500   581   6.5647508   542   5.8348107   402   5.994521   462   6.1355649   522   6.2557500   581   6.5647508   542   5.8466417   404   6.0014149   464   6.1398846   524   6.2614917   584   6.3699010   534   5.8453444   405   6.0088871   465   6.1420374   525   6.2639812   586   6.37716118   548   5.84529025   408   6.0112672   468   6.1464683   526   6.2653012   586   6.3767269   548   5.8522025   408   6.0112672   468   6.1464683   528   6.2690863   588   6.3767269   535   5.8667862   411   6.0185932   471   6.1548581   531   6.2747620   591   6.3815060   535   5.8666881   413   6.0284785   475   6.1563148   531   6.2785981   599   6.3855066   535   5.8666881   413   6.0284785   475   6.1654179   536   6.2785981   599   6.3855066   535   5.8666881   413   6.0284785   476   6.1656179   536   6.2915691   500   6.3865614   536   5.8865930   418   6.0354814   478   6.169617   534   6.2925667   595   6.3855066   5.8856144   5.8865330   418   6.0354814   478   6.165617   536   6.2915691   500   6.3865998   535   5.8860330   418   6.0453283   481   6.177641   542   6.2925660   602   6.4002574   565   5.9958987   425   6   |     |             | 1    |                   |           |           |          |             | Lf I   |             |
| 334   5.8111410   394   5.9763509   4.54   6.1180972   514   6.2422233   574   6.3526294   335   5.8141905   395   5.9788888   4.55   6.1202974   515   6.2441669   575   6.3543700   536   5.8171112   396   5.9814142   4.56   6.1224928   515   6.2441669   575   6.3563700   537   5.8200829   397   5.9839363   4.57   6.1246834   517   6.2480429   577   6.3578423   538   5.8230459   598   5.98364520   4.58   6.1263692   518   6.2499752   578   6.3573423   539   5.8260001   5.99   5.9889614   4.59   6.1290502   519   6.2519039   579   6.3613025   534   5.8318825   401   5.9939614   459   6.1290502   519   6.257500   581   6.3647503   542   5.8346107   402   5.9939614   461   6.1333980   521   6.257500   581   6.3647503   542   5.8346107   402   5.9989366   463   6.1372265   520   6.257500   581   6.3647503   542   5.8406417   404   6.0014149   464   6.1398846   524   6.2614917   554   6.3681872   5435444   405   6.0088132   465   6.1420374   525   6.2633983   555   6.3716118   5.8405384   406   6.0068532   466   6.1441856   526   6.2653012   556   6.3733198   347   5.8493248   407   6.0088132   467   6.1463293   527   6.2659005   557   6.3733198   349   5.850719   409   6.0112672   468   6.1463293   527   6.2679005   557   6.3750248   348   5.8652025   408   6.0112672   468   6.1463293   527   6.2679005   557   6.3753198   349   5.850719   409   6.0161572   470   6.1560828   528   6.2690963   588   6.3763262   350   5.8664681   413   6.0234476   473   6.1560593   522   6.2766435   592   6.3851944   5.5662681   413   6.0234476   473   6.1564179   536   6.2841342   593   6.385194   5.5664681   416   6.035660   476   6.1654179   536   6.2841342   596   6.3902407   555   5.8833224   419   6.0354814   478   6.1654179   536   6.2841342   596   6.39052407   557   5.8833224   419   6.0354814   478   6.1654179   536   6.2841342   596   6.390529   586   5.885390   418   6.0354814   478   6.1654179   536   6.2841342   596   6.3905290   586   5.99050829   448   6.0767840   447   6.1677165   539   6.2897156   599   6.3955616   | 11  |             |      |                   |           |           |          |             |        |             |
| 335   5.8141905   395   5.9788838   455   6.1202974   515   6.2441669   575   6.3543700   536   5.8171112   396   5.9814142   456   6.1224928   516   6.2461668   576   6.3561077   5.8200829   397   5.9839363   457   6.1246834   517   6.2480429   577   6.3578423   538   5.8230459   398   5.9364520   458   6.1203692   518   6.2499752   578   6.3593739   5.8260001   599   5.9889614   459   6.1203602   519   6.2519039   579   6.3619025   340   5.8289456   400   5.9914645   460   6.1312265   520   6.258288   580   6.3630281   5.8318825   401   5.9936964   461   6.1333980   521   6.2557500   581   6.3647503   542   5.8346107   402   5.9964521   462   6.1353649   522   6.2575676   582   6.3664704   343   5.8377304   408   5.9989366   463   6.1877271   523   6.2593815   583   6.3681872   5845444   405   6.0088131   465   6.1420374   525   6.2633983   555   6.3716118   346   5.8464388   406   6.0063532   466   6.1441856   526   6.2653012   586   6.373198   547   5.8493248   407   6.0088132   467   6.1463293   537   6.2690963   538   6.3767269   349   5.8550719   409   6.0137152   469   6.146683   528   6.2690963   538   6.3767269   349   5.8550719   409   6.0137152   469   6.1506028   529   6.2709884   589   6.3784262   585   5.8636312   412   6.0210343   472   6.1564581   531   6.2747620   591   6.3818160   352   5.8636312   412   6.0210343   472   6.1569599   532   6.2766435   539   6.3835066   535   5.8721178   415   6.038476   475   6.1635148   535   6.2878586   594   6.3868793   355   5.8771338   417   6.0334476   475   6.1654179   536   6.2878586   594   6.3868793   555   5.8749307   416   6.030862   477   6.1675165   537   6.2599667   595   6.3851948   556   5.8833224   419   6.0378799   479   6.1717006   539   6.2897156   599   6.3952916   586   5.8838284   419   6.0476323   481   6.1737861   540   6.295660   602   6.4002574   565   5.8989874   425   6.050892   485   6.1737861   540   6.2952660   602   6.4005254   566   5.905683   426   6.0544893   486   6.1800167   548   6.2952660   602   6.4005254   566   5.   |     |             |      |                   |           |           |          |             |        |             |
| 336   5.8171112   395   3.9814142   456   6.1224928   516   6.2461068   576   6.3561077   5.8200829   397   5.9839363   457   6.1246834   517   6.2480429   577   6.3578423   339   5.8230459   398   5.9864520   458   6.120502   518   6.2519039   579   6.3513025   58260001   599   5.9869614   459   6.120502   519   6.2519039   579   6.3613025   540   5.8289456   400   5.9914645   460   6.1312265   520   6.2578670   581   6.3647503   542   5.8348107   402   5.9964521   462   6.1335649   522   6.2575670   581   6.3647503   542   5.8348107   402   5.9964521   462   6.1335649   522   6.2575670   581   6.3647503   543   5.8377304   403   5.9989366   463   6.1377271   523   6.2593815   583   6.3664704   5.8464848   405   6.008871   465   6.1420374   525   6.2639981   585   6.3681872   5.8464388   406   6.0068532   466   6.1441856   526   6.2653012   586   6.37513198   347   5.8493248   407   6.0088132   467   6.1463293   527   6.2679005   587   6.3750248   548   5.8550719   409   6.0137152   469   6.1505028   529   6.2766435   588   6.3767269   534   5.8664681   412   6.0210233   472   6.1560328   529   6.2766435   539   6.3883066   5.8664681   413   6.0234476   473   6.1527327   530   6.2747620   591   6.3818160   5.8749307   416   6.0368473   475   6.163148   531   6.2747620   591   6.3818160   5.8749307   416   6.0368473   475   6.163148   533   6.278586   598   6.3835968   5.8721178   415   6.0387870   476   6.1675165   537   6.285981   597   6.385998   5.8749307   416   6.0368473   476   6.1675165   537   6.285981   597   6.3855998   5.8853324   419   6.0354874   478   6.1675165   537   6.285981   597   6.3953998   558   5.8865330   418   6.0354814   478   6.169617   538   6.285981   597   6.3952966   5.8856913   588   5.8865330   418   6.0354814   478   6.1675165   537   6.2859981   597   6.3952966   5.8856914   5.8868780   421   6.0426328   486   6.1737861   540   6.291599   600   6.04052574   560   5.8968733   426   6.0548993   486   6.1737861   540   6.291599   600   6.04058800   560   5.9053618   427   6.05   |     |             |      |                   |           |           |          |             |        |             |
| 337   5.8200829   397   5.9839363   457   6.1246834   517   6.2480429   577   6.3578429   538   5.8230459   539   5.9364520   458   6.1263692   518   6.2499752   578   6.35593739   5.8260001   599   5.9889614   459   6.1290502   519   6.2519039   579   6.3613025   540   5.8289456   400   5.9914645   460   6.1312265   520   6.2538288   580   6.3630281   541   5.8318825   401   5.9939614   461   6.1333980   521   6.2557500   581   6.3647503   542   5.8348107   402   5.9964521   462   6.1355649   522   6.2576676   582   6.3664704   543   5.8377304   403   5.9989966   463   6.1877271   523   6.2593815   583   6.3681872   544   5.8406417   404   6.0014149   464   6.1398846   524   6.2614917   584   6.3699010   545   5.8435444   405   6.0088871   465   6.1420374   525   6.2633983   585   6.3716118   546   5.8464848   406   6.0068532   466   6.1441856   526   6.2653012   586   6.3753198   5.852025   408   6.0112672   468   6.148683   527   6.2690963   588   6.3767269   549   5.8550719   409   6.0137152   469   6.1503028   529   6.2709884   589   6.3784262   5.8636312   412   6.021623   471   6.1548581   531   6.2747620   591   6.3818160   595   5.8664681   413   6.0234476   473   6.1548581   531   6.2746635   592   6.3885066   5.8664681   413   6.0234476   473   6.1548581   531   6.2746763   592   6.3885066   5.8749307   416   6.030662   477   6.1674165   533   6.2859667   595   6.3865793   555   5.871178   415   6.025860   474   6.1612073   534   6.2803938   594   6.3865793   555   5.877358   417   6.030862   477   6.1675165   537   6.2878366   596   6.3902407   556   5.8749307   416   6.0306623   476   6.1656179   536   6.2878366   596   6.3902407   557   5.8856144   422   6.045033   482   6.177861   540   6.2934193   601   6.5985919   562   5.8936330   418   6.035481   478   6.165617   538   6.2878366   596   6.3902407   564   5.8911539   424   6.045033   482   6.177861   540   6.2934193   601   6.5985919   565   5.898974   425   6.0520892   485   6.188046   544   6.2934193   601   6.5985919   566   5.9026333   4   |     |             |      |                   |           |           |          |             |        |             |
| 338   5.8230459   398   5.9364520   458   6.1263692   518   6.2499752   578   6.3595739   539   5.8260001   599   5.9889614   459   6.1290502   519   6.2519039   579   6.3613025   340   5.8289456   400   5.9914645   460   6.1312265   520   6.2538288   580   6.3630281   5.8318825   401   5.9939614   461   6.1333980   521   6.2557500   581   6.3647503   542   5.8348107   402   5.9954521   462   6.1355649   522   6.2576676   582   6.3664704   5.846417   404   6.0014149   464   6.1398846   524   6.2614917   584   6.3699010   345   5.846344   405   6.0088871   465   6.1463293   525   6.2633983   585   6.3716118   346   5.8464388   406   6.0063532   466   6.1463293   527   6.2653012   586   6.3753198   347   5.8493248   407   6.0088132   467   6.1463293   527   6.2672005   587   6.3750248   5.852025   408   6.0112672   468   6.1463683   528   6.2690963   598   6.3767269   349   5.8550719   409   6.0137152   469   6.1503028   529   6.2709884   589   6.3764269   552   5.8636312   412   6.0210233   472   6.1569790   532   6.2766135   592   6.3885066   353   5.8664681   413   6.0234476   473   6.15690954   534   6.2863912   596   6.3868793   555   5.872178   415   6.0282785   475   6.1633148   533   6.2785214   593   6.3868793   355   5.8749307   416   6.0306853   476   6.1654179   536   6.2841342   596   6.3902407   357   5.877338   417   6.0330862   477   6.1675165   537   6.2875186   598   6.3953998   359   5.8833224   419   6.0376879   479   6.1675165   537   6.2875186   598   6.3953998   359   5.888780   418   6.0354814   478   6.169614   538   6.2875386   598   6.3953998   359   5.8888780   418   6.0376470   479   6.1717006   538   6.287156   599   6.3935998   369   5.8861040   420   6.0426328   481   6.1758673   541   6.2934193   601   6.3985998   359   5.8833224   419   6.0426328   481   6.1758673   541   6.2934193   601   6.3985999   362   5.8916442   422   6.0450053   482   6.1777861   540   6.297199   603   6.4001972   604   6.596393   426   6.0450393   486   6.1820849   544   6.2934193   601   6.3985949   6   |     |             |      |                   |           |           |          |             |        |             |
| 339   5.8260001   599   5.9889614   459   6.1290502   519   6.2519039   579   6.3613025     340   5.8289456   400   5.9914645   460   6.1312265   520   6.2538288   580   6.3630281     341   5.8318825   401   5.9939614   461   6.1333980   521   6.257500   581   6.3647508     342   5.8346107   402   5.9939614   462   6.1353649   522   6.257676   582   6.36647508     343   5.8377304   403   5.9989966   463   6.1377271   523   6.2593815   583   6.3681872     344   5.8406417   404   6.0014149   464   6.1338846   524   6.2614917   584   6.3699010     345   5.8453444   405   6.0068532   466   6.14402374   525   6.2633983   585   6.3716118     346   5.8464388   406   6.0068532   466   6.1440856   526   6.2653012   586   6.3733198     347   5.8493248   407   6.0088132   467   6.1463293   527   6.2672005   587   6.3750248     348   5.852025   408   6.0112672   468   6.1484683   528   6.2690963   588   6.3767269     349   5.850719   409   6.0137152   469   6.1505028   529   6.279884   589   6.3764262     350   5.8579832   410   6.0161572   470   6.1527327   530   6.2747620   591   6.3818160     352   5.8607862   411   6.0283476   473   6.1548581   531   6.2747620   591   6.3818160     353   5.8664681   413   6.0234476   473   6.159799   532   6.2766435   592   6.3835066     353   5.8664681   413   6.0284476   473   6.159799   532   6.2875386   594   6.3868793     355   5.8721178   415   6.0288785   475   6.163148   535   6.2875386   594   6.3868793     356   5.8749307   416   6.036853   476   6.1654179   536   6.2875386   596   6.3902407     357   5.8777358   417   6.0354814   478   6.169617   538   6.2875386   596   6.3902407     357   5.8777358   417   6.0354814   478   6.169617   538   6.2875386   596   6.3902407     358   5.8888780   421   6.0426328   481   6.1757861   540   6.298493   601   6.395894     360   5.8888780   421   6.0426328   481   6.1758673   541   6.2934193   601   6.395894     363   5.8988780   421   6.0426328   481   6.1758673   541   6.2934193   601   6.395894     364   5.894028   428   6.0473722  |     |             |      |                   |           |           |          |             |        |             |
| 340   5.8289456   400   5.9914645   460   6.1312265   520   6.2588288   580   6.3630281   5.8318825   401   5.9939614   461   6.1333980   521   6.2557500   581   6.3647503   542   5.8346107   402   5.9964521   462   6.1355649   522   6.2576676   582   6.3664704   534   5.8377304   403   5.9989366   463   6.1377271   523   6.2553515   583   6.3681872   5.8406417   404   6.0014149   464   6.1398846   524   6.2614917   584   6.3699010   345   5.8435444   405   6.0038871   465   6.14420374   525   6.2633983   585   6.3716118   346   5.8464388   406   6.0063532   466   6.1441856   526   6.2653012   586   6.3733198   347   5.8495248   407   6.0088132   467   6.1463293   527   6.2672005   587   6.3750248   5.8522025   408   6.0112672   468   6.1563293   527   6.2672005   587   6.3750248   5.8550719   409   6.0137152   469   6.1503028   529   6.2709884   589   6.3764692   349   5.85607862   411   6.0185932   471   6.1548581   531   6.2747620   591   6.3818160   352   5.8664681   413   6.0234476   473   6.1590954   533   6.2766435   592   6.3865938   355   5.8664681   413   6.0234476   473   6.16590954   533   6.2869368   594   6.386793   355   5.8749307   416   6.0258660   474   6.1654179   536   6.2803958   594   6.3868793   355   5.874330   418   6.0258660   474   6.1675165   537   6.2859981   597   6.3919171   358   5.8805330   418   6.036862   477   6.1675165   537   6.2859981   597   6.3919171   358   5.8805330   418   6.0354814   478   6.169614   538   6.2878586   598   6.3962997   561   5.8886780   421   6.0426328   481   6.1758673   541   6.2934193   601   6.3952919   562   5.8916442   422   6.0450033   482   6.1775861   540   6.297569   603   6.4019172   364   5.891539   424   6.0426328   481   6.1758673   541   6.2934193   601   6.3985998   5.8916442   422   6.0450033   482   6.182086   546   6.2971098   603   6.4019172   364   5.891539   424   6.0426328   481   6.1758673   541   6.2934193   601   6.3985998   5.899404   425   6.0450333   486   6.180167   546   6.2971098   605   6.4005298   605   5.906833  |     |             |      |                   |           |           |          |             | 61 ° 1 |             |
| 341   5.8318825   401   5.9939614   461   6.1933980   521   6.257500   581   6.3647503   542   5.8348107   402   5.9964521   462   6.1355649   522   6.257676   582   6.3664704   543   5.8377304   403   5.9989366   463   6.1377271   523   6.2593315   583   6.3681873   584   5.8406417   404   6.0014149   464   6.1398846   524   6.2614917   584   6.3699010   545   5.8464388   406   6.0088132   466   6.1420374   525   6.2633983   585   6.3716118   584   5.8522025   408   6.0088132   467   6.1463293   527   6.2672005   587   6.3750248   585   5.8522025   408   6.0112672   468   6.1846838   528   6.2690963   588   6.3767269   549   5.8550719   409   6.0137152   469   6.1506028   529   6.2709884   589   6.3764262   551   5.8607862   411   6.0185932   471   6.1548581   531   6.2747620   591   6.3818160   352   5.8636312   412   6.0210233   472   6.1560790   532   6.2766135   532   6.3835066   5.8664681   413   6.0234476   473   6.1590973   534   6.2803958   594   6.3863793   535   5.8793969   414   6.0258660   474   6.161207   336   6.2829667   595   6.3805069   355   5.8749307   416   6.0306453   476   6.163148   535   6.2803958   594   6.3868793   355   5.8749307   416   6.0306453   476   6.1654179   536   6.2841912   596   6.3902407   5.8777358   417   6.030862   477   6.1675165   537   6.285981   597   6.391217   358   5.8865330   418   6.0350862   477   6.1675165   537   6.2877358   598   6.3902407   5.8877358   418   6.0350862   477   6.1675165   537   6.287981   597   6.3912171   358   5.8868780   421   6.0426328   481   6.1737861   540   6.293493   601   6.3953998   359   5.8888780   421   6.0450253   482   6.1779441   542   6.293493   601   6.3953998   362   5.8916442   422   6.0450253   482   6.1779441   542   6.293493   601   6.3953998   366   5.992633   424   6.0497335   484   6.1820849   544   6.293493   601   6.3953998   366   5.995363   428   6.0473722   483   6.1802049   544   6.293493   601   6.3953994   601   6.3953994   601   6.0450253   601   6.0450253   601   6.0450253   601   6.0450253   601   6   | 339 | 5.8260001   | 599  | 5.9889614         | 459       | 6.1290502 | 519      | 6.2519039   | 579    | 6.3613025   |
| 341   5.8318825   401   5.9939614   461   6.1933990   521   6.2557500   581   6.3647508   342   5.8348107   402   5.9969366   463   6.13575649   522   6.2576676   582   6.3664704   343   5.8406417   404   6.0014149   464   6.1398846   524   6.2614917   584   6.3699010   345   5.8435444   405   6.0038871   465   6.1420374   525   6.2633983   585   6.3716118   346   5.8464988   406   6.0068539   466   6.1441856   526   6.2653012   586   6.3733198   347   5.8493248   407   6.0088132   467   6.1463293   527   6.2672005   587   6.3750248   348   5.8522025   408   6.0112672   468   6.1846838   528   6.2690963   588   6.3767269   349   5.8567932   410   6.0161572   468   6.1505028   529   6.2709884   589   6.3784262   351   5.8607862   411   6.0185932   471   6.1548581   531   6.2747620   591   6.3818160   352   5.8636312   412   6.0210233   472   6.1569790   532   6.2765314   593   6.3855066   353   5.8664681   413   6.0234476   473   6.1590951   534   6.2863958   594   6.3868793   355   5.8749307   416   6.0258660   474   6.1612073   534   6.2863958   594   6.3868793   355   5.8749307   416   6.0306853   476   6.1654179   536   6.2843938   597   6.3952407   55877358   417   6.0376862   477   6.1676165   537   6.285981   597   6.391251   359   5.8868793   355   5.877358   417   6.0390862   477   6.1676165   537   6.285981   597   6.391251   359   5.8883824   419   6.0378709   479   6.1717006   539   6.2897156   599   6.3952616   360   5.888380   421   6.046323   481   6.177841   478   6.169614   538   6.2878586   598   6.3905299   361   5.888380   421   6.046323   482   6.1779441   542   6.293493   603   6.4019172   364   5.8971539   424   6.0497335   484   6.1820849   544   6.293493   603   6.4019172   364   5.8971539   424   6.0497335   484   6.1820849   544   6.293493   603   6.4019172   364   5.896333   426   6.056889   486   6.1862086   546   6.9062753   606   6.4068800   566   5.9053618   427   6.0567840   467   6.1820849   544   6.293493   603   6.4019174   366   5.905633   426   6.0567840   467   6.1820849  | 340 | 5.8289456   | 400  | 5.9914645         | 460       | 6.1312265 | 520      | 6.2538288   | 580    | 6.3630281   |
| \$\frac{342}{343} \ \ 5.8346107 \ 402 \ 5.99674521 \ 462 \ 6.1355649 \ 522 \ 6.2576676 \ 582 \ 6.3664704 \ 343 \ 5.8377304 \ 403 \ 5.9989366 \ 463 \ 6.1377271 \ 523 \ 6.25953315 \ 583 \ 6.3681873 \ 344 \ 5.8406417 \ 404 \ 6.0014149 \ 464 \ 6.1398486 \ 524 \ 6.2614917 \ 584 \ 6.3698010 \ 345 \ 5.8435444 \ 405 \ 6.0088132 \ 466 \ 6.1420374 \ 525 \ 6.2633983 \ 585 \ 6.3716118 \ 346 \ 5.8464388 \ 406 \ 6.0088132 \ 467 \ 6.1463293 \ 527 \ 6.2672005 \ 587 \ 6.3750248 \ 348 \ 5.8522025 \ 408 \ 6.0112672 \ 468 \ 6.14846383 \ 528 \ 6.2679005 \ 587 \ 6.3750248 \ 349 \ 5.8550719 \ 409 \ 6.0137152 \ 469 \ 6.1505028 \ 529 \ 6.2709884 \ 589 \ 6.3761262 \ 351 \ 5.8607862 \ 411 \ 6.0185932 \ 471 \ 6.1548581 \ 531 \ 6.2747620 \ 591 \ 6.3818160 \ 352 \ 5.8636312 \ 412 \ 6.0210233 \ 472 \ 6.1569790 \ 532 \ 6.2766135 \ 532 \ 6.3855066 \ 3553 \ 5.8664681 \ 413 \ 6.0234476 \ 473 \ 6.1639148 \ 535 \ 5.8692969 \ 414 \ 6.0258660 \ 474 \ 6.161207 \ 334 \ 6.2803985 \ 594 \ 6.3885066 \ 355 \ 5.871178 \ 415 \ 6.0282785 \ 475 \ 6.1633148 \ 535 \ 6.2849397 \ 595 \ 6.3885614 \ 356 \ 5.8749307 \ 416 \ 6.0306453 \ 476 \ 6.163149 \ 536 \ 5.8743930 \ 595 \ 5.8838224 \ 419 \ 6.030662 \ 477 \ 6.1654179 \ 536 \ 6.2841312 \ 596 \ 6.3902407 \ 558 \ 5.8868380 \ 418 \ 6.0350862 \ 477 \ 6.1675165 \ 537 \ 6.2829667 \ 595 \ 6.391217 \ 364 \ 5.898974 \ 425 \ 6.0473735 \ 481 \ 6.032682 \ 481 \ 6.1737861 \ 540 \ 6.2897156 \ 599 \ 6.3952616 \ 366 \ 5.8940829 \ 428 \ 6.0473732 \ 483 \ 6.1820849 \ 544 \ 6.2934193 \ 601 \ 6.395297 \ 361 \ 5.8888780 \ 421 \ 6.0426328 \ 481 \ 6.1737861 \ 540 \ 6.2894193 \ 601 \ 6.3952666 \ 5.9952683 \ 425 \ 6.0473722 \ 483 \ 6.1820849 \ 544 \ 6.2984193 \ 601 \ 6.395285 \ 605 \ 5.8940829 \ 428 \ 6.0473722 \ 483 \ 6.1820849 \ 544 \ 6.2984193 \ 601 \ 6.395285 \ 605 \ 5.896833 \ 426 \ 6.0473722 \ 483 \ 6.1820849 \ 544 \ 6.2984193 \ 601 \ 6.395285 \ 605 \ 5.896833 \ 426 \ 6.0473732 \ 483 \ 6.1820849 \ 544 \ 6.2984192 \ 604 \ 6.402574 \ 366 \ 5.9058318 \ 426 \ 6.0567840 \ 467 \ 6.1820849 \ 544 \ 6.2984192 \ 604 \ 6.4052574 \ 668 \ 5.905  | 341 |             |      | U II              |           |           |          |             |        |             |
| 348   5.8377304   409   5.9989366   469   6.1377271   523   6.2595815   583   6.3681879     344   5.8406417   404   6.0014149   464   6.1398846   524   6.2614917   584   6.3699010     345   5.8435444   405   6.0038871   465   6.1420374   525   6.2638983   585   6.3716118     346   5.8464388   406   6.0063532   466   6.1441856   526   6.2653012   586   6.3733198     347   5.8493248   407   6.0088132   467   6.1463293   527   6.2672005   587   6.3750248     348   5.852025   408   6.0112672   468   6.1484683   528   6.2690963   588   6.3767269     349   5.8550719   409   6.0137152   469   6.1505028   529   6.2709884   589   6.3784262     350   5.8579392   410   6.0161572   470   6.1527327   530   6.2724770   590   6.3801225     351   5.8607862   411   6.0185932   471   6.1548581   531   6.2746135   592   6.3853066     352   5.8636312   412   6.0210233   472   6.1563790   532   6.2766135   592   6.3853066     353   5.8664681   413   6.0234476   473   6.1599054   533   6.2785214   593   6.3851944     354   5.8692969   414   6.0258660   474   6.1612073   534   6.2803958   594   6.3868793     355   5.8721178   415   6.0386873   476   6.1654179   536   6.2843935   594   6.3868793     355   5.8749307   416   6.0366453   476   6.1654179   536   6.2843981   597   6.3902407     357   5.8777358   417   6.0390862   477   6.1675165   537   6.2859981   597   6.3919171     358   5.8865330   418   6.0354814   478   6.169614   538   6.2878586   598   6.3935998     359   5.8881800   421   6.0426328   481   6.1757861   540   6.2934193   601   6.3955998     360   5.8861040   420   6.0402547   480   6.1737861   540   6.2934193   601   6.3955998     361   5.8888780   421   6.0426328   481   6.1758673   541   6.2934193   601   6.3955998     362   5.8916442   422   6.0450053   482   6.1779441   542   6.2952660   602   6.402574     363   5.894028   423   6.0473722   483   6.1800167   543   6.2971093   603   6.4019172     364   5.8971539   424   6.0497335   484   6.1820849   544   6.2989492   604   6.4035742     366   5.905833   426   6   | 342 | 5.8348107   | 402  |                   |           |           | 1        |             | £1 ,   |             |
| 344   5.8406417   404   6.0014149   464   6.1398846   524   6.2614917   584   6.3699010   345   5.8435444   405   6.0088871   465   6.1420374   525   6.2633983   585   6.3716118   346   5.8464388   406   6.0063532   466   6.1441856   526   6.2653012   586   6.3733198   347   5.8493248   407   6.0088132   467   6.1463293   527   6.2672005   537   6.3750248   348   5.8522025   408   6.0112672   468   6.1484683   528   6.2690963   588   6.3767269   349   5.8550719   409   6.0137152   469   6.1505028   529   6.2709884   589   6.3784262   350   5.8579332   410   6.0185932   471   6.1548581   531   6.2747620   591   6.3818160   352   5.8607862   411   6.0185932   472   6.1569790   532   6.2766133   592   6.3835066   353   5.8664681   413   6.0234476   473   6.1549595   533   6.2765213   592   6.3855066   355   5.8629999   414   6.0258660   474   6.1612073   534   6.2803958   594   6.3868793   355   5.871138   415   6.0282785   475   6.163148   535   6.2829667   595   6.3885614   356   5.8749307   416   6.0360853   476   6.1654179   536   6.2829667   595   6.3885614   356   5.8749307   416   6.0360853   476   6.1654179   536   6.2829667   595   6.3855066   5.8749307   416   6.0360853   476   6.1654179   536   6.2829667   595   6.3952407   585   5.8853224   419   6.0378709   479   6.1717006   539   6.2897156   599   6.3952616   360   5.8885780   421   6.0426323   481   6.1758673   541   6.2934193   601   6.3953998   586   5.8916442   422   6.0450033   482   6.1779441   542   6.2952660   602   6.402574   565   5.8998974   425   6.0426323   484   6.1820849   544   6.2952660   602   6.402574   566   5.8998974   425   6.0560892   485   6.1820849   544   6.2984193   601   6.395394   603   6.4019172   666   5.905633   427   6.0567840   467   6.1820849   544   6.2984192   604   6.4035742   6.656334   426   6.0567840   447   6.1820849   544   6.2984192   604   6.4035742   6.0567840   467   6.1820849   544   6.2984192   604   6.4035742   6.0567840   467   6.1820849   544   6.2984192   604   6.4035742   6.056334   426   6.0560   | 343 |             |      |                   |           |           |          |             |        |             |
| \$\begin{array}{c c c c c c c c c c c c c c c c c c c  | 344 | 5.8406417   | 404  |                   |           |           |          |             |        | 6.3699010   |
| 346   5.8464388   406   6.0063532   466   6.1441856   526   6.2653012   586   6.3733198   347   5.849348   407   6.0088132   467   6.1463293   527   6.2672005   537   6.3750248   348   5.8550719   409   6.0112672   468   6.1484683   528   6.2690963   588   6.3767269   349   5.8550719   409   6.0137152   469   6.1505028   529   6.2709884   589   6.3764262   351   5.8607862   411   6.0185932   471   6.1548581   531   6.2747620   591   6.3818160   352   5.8636312   412   6.0210233   472   6.1569790   532   6.2766435   592   6.3835066   353   5.8664681   413   6.0234476   473   6.1590954   373   6.2766313   592   6.3855066   355   5.8749307   416   6.0258660   474   6.1612074   3.53   6.2829667   593   6.3865793   355   5.8749307   416   6.0282785   475   6.1633148   535   6.2829667   595   6.386544   356   5.8749307   416   6.0306853   476   6.1654179   536   6.2841312   596   6.3902407   5.8777358   417   6.0330862   477   6.1675165   537   6.2829881   597   6.391217   358   5.8805330   418   6.0354814   478   6.16961   538   6.2878386   598   6.395296   359   5.883224   419   6.0378709   479   6.1717006   539   6.2897156   599   6.3952916   360   5.8868793   424   6.0426328   481   6.1758673   541   6.2934193   601   6.5985919   362   5.8916442   422   6.0450033   482   6.1779441   542   6.2952660   602   6.4002574   364   5.8971539   424   6.0497335   484   6.1820849   544   6.2991992   603   6.4019172   364   5.8971539   424   6.0497335   484   6.1820849   544   6.2991993   603   6.4019172   364   5.8971539   424   6.0497335   484   6.1820849   544   6.2991990   603   6.4019172   366   5.9926333   426   6.0567840   467   6.1820841   547   6.904488   607   6.405285   366   5.9026333   426   6.0567840   467   6.1820841   547   6.904488   607   6.405285   366   5.9050839   428   6.0591292   488   6.1908154   548   6.9062753   608   6.4101749   368   5.9050829   428   6.0591292   488   6.1908154   548   6.9062753   608   6.4101749   368   5.9050829   428   6.0591292   488   6.1908154   548   6.9062753   608   6.   | 345 | 5.8435444   | 405  |                   |           |           |          |             |        | 6.3716118   |
| 347   5.8493248   407   6.0088132   467   6.1463293   527   6.2672005   587   6.3750248   348   5.8529025   408   6.0112672   468   6.1484683   528   6.2690963   588   6.3767269   349   5.8550719   409   6.0137152   469   6.1505028   529   6.2709884   589   6.3784262   350   5.8579332   410   6.0161572   470   6.1527327   530   6.2728770   590   6.3801225   351   5.8607862   411   6.0185932   471   6.1548581   531   6.27467620   591   6.3818160   352   5.8636312   412   6.0210233   472   6.1569790   532   6.2766435   592   6.3853066   353   5.8664681   413   6.0234476   473   6.1590954   373   6.2765435   592   6.3855066   354   5.8692969   414   6.0258660   474   6.1612073   534   6.2803958   594   6.3868793   355   5.8721178   415   6.0282785   475   6.1633148   535   6.2803958   594   6.3868793   355   5.8749307   416   6.0306453   476   6.1654179   536   6.28441312   596   6.3902407   357   5.8777358   417   6.0330862   477   6.1675165   537   6.2859981   597   6.3919171   858   5.8805330   418   6.0354814   478   6.169614   538   6.2878586   598   6.3935908   359   5.8838224   419   6.0378709   479   6.1717006   539   6.2897156   599   6.3952616   360   5.8861040   420   6.0402547   480   6.1737861   540   6.2934193   601   6.3953918   561   5.8888780   421   6.0426323   481   6.1758673   541   6.2934193   601   6.3953919   563   5.894028   422   6.0450053   482   6.1779441   542   6.2952660   602   6.402574   563   5.894028   423   6.0473722   483   6.1800167   543   6.2971093   603   6.4019172   364   5.8971539   424   6.0497335   484   6.1820849   544   6.298492   604   6.4035742   365   5.8998974   425   6.0590892   485   6.1802641   547   6.9047488   607   6.405285   366   5.9053031   426   6.0567840   437   6.1882641   547   6.9047488   607   6.4058285   368   5.9050829   428   6.0591292   488   6.1908154   548   6.9062753   608   6.4101749   368   5.9050829   428   6.0591292   488   6.1908154   548   6.9062753   608   6.4101749   368   5.9050829   428   6.0591292   488   6.1908154   548   6.906275   | 346 |             |      |                   | 1 .       |           |          |             | • )    |             |
| 348         5.8529025         408         6.0112672         468         6.1484683         528         6.2690963         588         6.3767269           349         5.8550719         409         6.0137152         469         6.1505028         529         6.2709884         589         6.3764262           350         5.8579332         410         6.0161572         470         6.1527327         530         6.2728770         590         6.3801225           351         5.8607862         411         6.0185932         471         6.1548581         531         6.2747630         591         6.3818160           352         5.8636312         412         6.0234476         472         6.1569790         532         6.2766433         592         6.385066           353         5.8664681         413         6.0258660         474         6.1612073         534         6.2803958         594         6.3868793           355         5.8721178         415         6.0282785         475         6.1633148         535         6.2829667         595         6.3885614           356         5.872188         476         6.1654179         536         6.2843981         597         6.3919171           3  | 347 |             |      |                   |           |           |          |             |        |             |
| 349         5.8550719         409         6.0137152         469         6.1505028         529         6.2709884         589         6.3784262           350         5.8579332         410         6.0161572         470         6.1527327         530         6.2728770         590         6.3801225           351         5.8607862         411         6.0185932         471         6.1548581         531         6.2747620         591         6.3818160           352         5.8636312         412         6.0210233         472         6.1590954         532         6.2764935         592         6.3835066           353         5.8664681         413         6.023476         473         6.1590954         33         6.2803958         594         6.3855066           354         5.8692969         414         6.0258660         474         6.1633148         535         6.2803958         594         6.3868793           355         5.8749307         416         6.0390875         476         6.1633148         535         6.2841312         596         6.3902407           357         5.8749307         416         6.0330862         477         6.1675165         537         6.287981         597   | 348 |             |      |                   |           | 1         | 1 1      |             |        |             |
| 350         5.8579332         410         6.0161572         470         6.1527327         530         6.2728770         590         6.3801225           351         5.8607862         411         6.0185932         471         6.1548581         531         6.2747620         591         6.3818160           352         5.8636312         412         6.0210233         472         6.1569790         532         6.276635         592         6.3835066           353         5.8664681         413         6.0234476         473         6.1590954         533         6.2768135         592         6.3853066           354         5.8692969         414         6.0258660         474         6.161907         534         6.2803958         594         6.386793           355         5.8721178         415         6.0282785         475         6.1633148         535         6.2829667         595         6.386514           356         5.8749307         416         6.0306453         476         6.1654179         536         6.2841312         596         6.3902407           357         5.8749307         416         6.035082         477         6.1675165         537         6.285981         597         6.3  | 349 |             |      |                   |           |           |          |             |        |             |
| 351         5.8607862         411         6.0185932         471         6.1548581         531         6.2747620         591         6.3818160           352         5.8636312         412         6.0210233         472         6.1569790         532         6.2766135         592         6.3835066           353         5.8664681         413         6.0234476         473         6.1590954         33         6.276785214         593         6.3835066           354         5.8692969         414         6.0258660         474         6.1612073         534         6.2803958         594         6.3868793           355         5.8721178         415         6.0282785         475         6.1633148         535         6.2829667         595         6.3885614           356         5.8749307         416         6.0306853         476         6.1675165         536         6.2841342         596         6.3902407           357         5.8749307         416         6.0330862         477         6.1675165         536         6.28758386         598         6.3902407           358         5.8805330         418         6.03768414         478         6.169616         538         6.28758366         598   | 050 |             |      |                   |           |           | <u> </u> |             | l''    |             |
| 352         5.8636312         412         6.0210233         472         6.1569790         582         6.2766435         592         6.3835066           353         5.8664681         413         6.0234476         478         6.1599954         533         6.2765214         593         6.3851944           354         5.8692969         414         6.0282785         474         6.1612073         534         6.2803958         594         6.3868793           355         5.8721178         415         6.0282785         475         6.1633148         535         6.2829667         595         6.386194           356         5.8749307         416         6.0396853         476         6.1654179         536         6.28441312         596         6.3902407           357         5.877358         417         6.0330862         477         6.1675165         537         6.2859981         597         6.3919171           358         5.8805330         418         6.0354814         478         6.169616         538         6.2878366         598         6.3952918           360         5.8861040         420         6.0402574         480         6.1737861         540         6.2971569         599 <td< td=""><td></td><td></td><td></td><td></td><td></td><td>)</td><td></td><td></td><td></td><td></td></td<>   |     |             |      |                   |           | )         |          |             |        |             |
| 353         5.8664681         -413         6.0234476         473         6.1590954         333         6.2785214         593         6.3851944           354         5.8692969         414         6.0258660         474         6.1612073         534         6.2803958         594         6.3868793           355         5.8721178         415         6.0282785         475         6.1633148         535         6.28029667         595         6.3868614           356         5.8749307         416         6.03068453         476         6.1654179         536         6.2859981         596         6.3902407           357         5.8777358         417         6.0330862         477         6.1675165         537         6.2859981         597         6.3919171           358         5.8805330         418         6.0354814         478         6.169614         538         6.2878586         598         6.3935998           359         5.8861040         420         6.0402547         480         6.1737861         540         6.2971569         599         6.3952616           360         5.8868780         421         6.0426323         481         6.1757861         540         6.2931913         601  |     |             |      |                   |           |           |          |             |        |             |
| 354         5.8692969         414         6.0258660         474         6.1612073         534         6.2803958         594         6.3868793           355         5.8721178         415         6.0282785         475         6.163148         535         6.2829667         595         6.3885614           356         5.8749307         416         6.0360853         476         6.1654179         536         6.2829667         595         6.382614           357         5.8777358         417         6.0330862         477         6.1675165         537         6.2859981         597         6.3919171           358         5.8805330         418         6.0354814         478         6.169616         538         6.2878586         598         6.3935908           359         5.8888284         419         6.0378709         479         6.1717006         539         6.2897156         599         6.3952616           360         5.8888780         421         6.0426323         481         6.1757861         540         6.2915691         600         6.3969297           361         5.8888780         421         6.0450033         482         6.1779441         542         6.2952660         602   |     |             |      |                   |           |           |          |             |        |             |
| 355         5.8721178         415         6.0982785         475         6.1633148         535         6.2829667         595         6.3885614           356         5.8749307         416         6.0306853         476         6.1654179         536         6.2841342         596         6.3902407           357         5.8777358         417         6.0330862         477         6.1675165         537         6.28459981         597         6.3912171           358         5.8805330         418         6.0354814         478         6.16961°         538         6.2878386         598         6.3935998           359         5.8861040         420         6.0402547         480         6.1737861         540         6.2915691         600         6.3952966           361         5.8888780         421         6.0426328         481         6.1758673         541         6.2934193         601         6.8983919           362         5.8916442         422         6.0450033         482         6.1779441         542         6.2971099         603         6.4092574           363         5.894028         423         6.0473722         483         6.18014016         542         6.2971099         603         <  |     |             |      |                   |           |           | : 1      |             |        |             |
| 356         5.8749307         416         6.0306¥53         476         6.1654179         536         6.2841342         596         6.3902407           357         5.8777358         417         6.0330862         477         6.1675165         537         6.2859381         597         6.3919171           358         5.8805330         418         6.0354814         478         6.169614         538         6.2857856         598         6.3935998           359         5.8861040         420         6.0473709         479         6.1717006         539         6.2897156         599         6.3952916           360         5.8868780         421         6.0426323         481         6.175861         540         6.2915691         601         6.3985949           362         5.8916442         422         6.045033         482         6.175863         541         6.2952660         602         6.402574           363         5.894028         423         6.0450333         482         6.1758631         541         6.2952660         602         6.3985949           363         5.894028         423         6.0473722         483         6.180167         543         6.2971093         603         6.401  |     |             |      |                   |           |           |          |             |        |             |
| 357         5.8777358         417         6.0330862         477         6.1675165         537         6.2859981         597         6.3919171           858         5.8805330         418         6.0354814         478         6.169614.         538         6.2878386         598         6.3935998           359         5.8861040         419         6.0378709         479         6.1717006         539         6.2897156         599         6.3952916           360         5.8861040         420         6.0402547         480         6.1737861         540         6.2915691         600         6.3969297           361         5.8888780         421         6.0426328         481         6.1758673         541         6.2934193         601         6.3969297           362         5.8916442         422         6.0450053         482         6.1779441         542         6.2952660         602         6.402574           363         5.894028         423         6.0473722         483         6.1800167         543         6.2971093         603         6.4019172           364         5.8971539         424         6.0497335         484         6.1820849         544         6.2989492         604 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>  |     |             |      |                   |           |           |          |             |        |             |
| 858         5.8805330         418         6.0354814         478         6.169616         538         6.2878586         598         6.3935908           359         5.8838224         419         6.0378709         479         6.1717006         539         6.2897156         599         6.3952616           360         5.8861040         420         6.0402547         480         6.1737861         540         6.2915691         600         6.3969297           361         5.8888780         421         6.0426323         481         6.17578673         541         6.2934193         601         6.3985949           362         5.8916442         422         6.0450053         482         6.1779441         542         6.2952660         602         6.402574           363         5.894028         423         6.0473722         483         6.1800167         543         6.2971099         603         6.4019172           364         5.8971539         424         6.0497335         484         6.1820849         544         6.2984949         604         6.4035742           365         5.8998974         425         6.05644393         486         6.1862086         546         6.906190         606 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>  |     |             |      |                   |           |           |          |             |        |             |
| 359         5.8833224         419         6.0378709         479         6.1717006         539         6.2897156         599         6.3952616           360         5.8861040         420         6.0402547         480         6.1737861         540         6.2915691         600         6.3969297           361         5.888780         421         6.0426328         481         6.1758673         541         6.2934193         601         6.3945949           362         5.8916442         422         6.045053         482         6.1779441         542         6.2952660         602         6.402574           363         5.894028         423         6.0473722         483         6.1800167         543         6.2971093         603         6.4019172           364         5.8971539         424         6.0497335         484         6.1820849         544         6.2989492         604         6.4052742           365         5.8998974         425         6.0520892         485         6.1841489         545         6.3026190         606         6.4052285           366         5.9026333         426         6.0544893         436         6.18628641         547         6.304488         607         6  |     |             |      |                   |           |           |          |             |        |             |
| 360         5.8861040         420         6.0402547         480         6.1737861         540         6.2915691         600         6.3969297           361         5.8888780         421         6.0426328         481         6.1758673         541         6.2934193         601         6.3963297           362         5.8916442         422         6.045053         482         6.1779441         542         6.2952660         602         6.402574           363         5.8944028         423         6.0473722         483         6.1800167         543         6.2971093         603         6.4019172           364         5.8971599         424         6.0497335         484         6.1820849         544         6.2989492         603         6.4019172           365         5.8998974         425         6.0520892         485         6.1841489         545         6.3026190         606         6.4052285           366         5.9053618         427         6.0567840         467         6.1882641         547         6.304488         607         6.4053288           368         5.9080829         428         6.0591232         488         6.1908154         548         6.3062753         608   |     |             |      |                   |           |           |          |             |        |             |
| 361         5.8888780         421         6.0426328         481         6.1758673         541         6.2934193         601         6.5985949           362         5.8916442         422         6.045053         482         6.1779441         542         6.2952660         602         6.402574           363         5.8944028         423         6.0473722         483         6.1800167         543         6.2971093         603         6.4019172           364         5.8971539         424         6.0497335         484         6.1820849         544         6.2989492         604         6.045742           365         5.8998974         425         6.0520892         485         6.1841489         545         6.5007588         605         6.4052285           366         5.9026333         426         6.0544893         436         6.1862086         546         6.5026190         606         6.4068800           367         5.9053618         427         6.0567840         467         6.1882641         547         6.304488         607         6.4035288           368         5.9080829         428         6.0591232         488         6.1908154         548         6.9062753         608         6  | 359 | 5.8833224   | 419  | 6.0378709         | 479       | 6.1717006 | 539      | 6.2897156   | 599    | 6.3952616   |
| 361         5.8888780         421         6.0426328         481         6.1758673         541         6.2934193         601         6.5985949           362         5.8916442         422         6.045053         482         6.1779441         542         6.2952660         602         6.402574           363         5.8944028         423         6.0473722         483         6.1800167         543         6.2971093         603         6.4019172           364         5.8971539         424         6.0497335         484         6.1820849         544         6.2989492         604         6.045742           365         5.8998974         425         6.0520892         485         6.1841489         545         6.5007588         605         6.4052285           366         5.9026333         426         6.0544893         436         6.1862086         546         6.5026190         606         6.4068800           367         5.9053618         427         6.0567840         467         6.1882641         547         6.304488         607         6.4035288           368         5.9080829         428         6.0591232         488         6.1908154         548         6.9062753         608         6  | 360 | 5.8861040   | 420  | 6.0402547         | 480       | 6.1737861 | 540      | 6.2915691   | 600    | 6.3969297   |
| 362         5.8916442         422         6.0450053         482         6.1779441         542         6.2952660         602         6.402574           363         5.8944028         423         6.0473722         483         6.1800167         543         6.2971099         603         6.4019172           364         5.8971539         424         6.0497335         484         6.1820849         544         6.2989492         604         6.4035742           365         5.8998974         425         6.0520892         485         6.1841489         545         6.9026190         605         6.4052285           366         5.9026383         426         6.0544893         486         6.1862086         546         6.9026190         606         6.4068800           367         5.9053618         427         6.0567840         467         6.1882641         547         6.3044488         607         6.4095288           368         5.9080829         428         6.0591282         488         6.1908154         548         6.9062753         608         6.4101749   |     |             |      |                   |           |           |          |             |        |             |
| 363         5.8944028         423         6.0473722         483         6.1800167         543         6.2971093         603         6.4019172           364         5.8971539         424         6.0497335         484         6.1820849         544         6.298492         604         6.403742           365         5.8998974         425         6.0520892         485         6.1841489         545         6.3007588         605         6.4052285           366         5.9026333         426         6.0544393         486         6.18628641         547         6.9044488         607         6.4068800           367         5.9050618         427         6.0567840         467         6.18828641         547         6.9044488         607         6.4052988           368         5.9080829         428         6.0591232         488         6.1908154         548         6.3062753         608         6.4101749  |     |             |      |                   |           |           |          |             |        |             |
| 364         5.8971539         424         6.0497335         484         6.1820849         544         6.2989492         604         6.4035742           365         5.8998974         425         6.0520892         485         6.1841489         545         6.3007538         605         6.4052285           366         5.9026333         426         6.0544393         486         6.1862864         546         6.9062753         606         6.4068800           367         5.9050818         427         6.0567840         467         6.1882041         547         6.9044488         607         6.4053288           368         5.9080829         428         6.0591232         488         6.1909154         548         6.3062753         608         6.4101749  | 1   |             |      |                   |           |           |          |             |        |             |
| 365         5.8998974         425         6.0520892         485         6.1841489         545         6.3007858         605         6.4052285           366         5.9026333         426         6.0544393         486         6.1862086         546         6.8026190         606         6.4068800           367         5.9058618         427         6.0567840         467         6.1882641         547         6.9044488         607         6.4085288           368         5.9080829         428         6.0591232         488         6.1908154         548         6.9062753         608         6.4101749  |     |             |      |                   |           |           |          |             |        |             |
| 366         5.9026333         426         6.0544393         436         6.1862086         546         6.9026190         606         6.4068800           367         5.9058618         427         6.0567840         467         6.1882641         547         6.9044488         607         6.4085288           368         5.9080829         428         6.0591232         488         6.1903154         548         6.9062753         608         6.4101749  |     |             |      |                   |           |           |          |             |        |             |
| 367         5.9053618         427         6.0567840         467         6.1882641         547         6.9044488         607         6.4085288           368         5.9080829         428         6.0591232         488         6.1903154         548         6.9062753         608         6.4101749  |     |             |      |                   |           |           |          | 1           |        |             |
| <b>368</b>   <b>5.9080829</b>   <b>428</b>   <b>6.0591282</b>   <b>488</b>   <b>6.1908154</b>   <b>548</b>   <b>6.9062753</b>   <b>608</b>   <b>6.4101749</b>  |     |             |      |                   |           |           |          |             |        |             |
|  |     |             | 1 1  |                   |           | 1         |          | t .         |        |             |
| The state of the s   |     |             |      |                   |           |           |          |             |        |             |
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TABLE LIV.

HYPERBOLIC LOGARITHMS.

| Num.       | Hyp. Log.              | Num.       | Hyp. Log.              | Num.       | Hyp. Log.              | Num.       | Hyp. Log.              | Num.        | Hyp. Log.              |
|------------|------------------------|------------|------------------------|------------|------------------------|------------|------------------------|-------------|------------------------|
| 610        | 6.4134590              | 670        |                        | 790        | 6.5930445              | 790        |                        |             |                        |
| 611        | 6.4150970              | 671        | 6.5072777<br>6.5087691 | 731        | 6.5944135              | 791        | 6.6720329<br>6.6732980 | 850<br>851  | 6.7452363              |
| 612        | 6.4167323              | 672        | 6.5102583              | 732        | 6.5957805              | 792        | 6.6745614              | 852         | 6.7464121<br>6.7475865 |
| 613        | 6.4183649              | 673        | 6.5117453              | 733        | 6.5971457              | 793        | 6.6758232              | 853         | 6.7487595              |
| 614        | 6.4199949              | 674        | 6.5132301              | 734        | 6.5985090              | 794        | 6.6770835              | 854         | 6.7499312              |
| 615        | 6.4216223              | 675        | 6.5147127              | 735        | 6.5998705              | 795        | 6.6783421              | 855         | 6.7511015              |
| 616        | 6.4232470              | 676        | 6.5161931              | 736        | 6.6012301              | 796        | 6.6795992              | 856         | 6.7522704              |
| 617        | 6.4248690              | 677        | 6.5176713              | 737        | 6.6025879              | 797        | 6.6808547              | 857         | 6.7534879              |
| 618        | 6.4264885              | 678        | 6.5191473              | 738        | 6.6039438              | 798        | 6.6821086              | 858         | 6.7546041              |
| 619        | 6.4281052              | 679        | 6.5206211              | 739        | 6.6052979              | 799        | 6.6833609              | 859         | 6.7557689              |
| 620        | 6.4297195              | 680        | 6.5220928              | 740        | 6.6066502              | 800        | 6.6846117              | 860         | 6.7569324              |
| 621        | 6.4313311              | 681        | 6.5235623              | 741        | 6.6080006              | 801        | 6.6858609              | 861         | 6.7580945              |
| 622        | 6.4329401              | 682        | 6.5250297              | 742        | 6.6093492              | 802        | 6.6871086              | 862         | 6.7592553              |
| 623        | 6.4345465              | 683        | 6.5264949              | 743        | 6.6106960              | 803        | 6.6883547              | 863         | 6.7604147              |
| 624        | 6.4361504              | 684        | 6.5279579              | 744        | 6.6120410              | 804        | 6.6895993              | 864         | 6.7615728              |
| 625<br>626 | 6.4377516              | 685        | 6.5294188              | 745        | 6.6133842              | 805        | 6.6908423              | 865         | 6.7627295              |
| 627        | 6.4393504<br>6.4409465 | 686<br>687 | 6.5308776<br>6.5323343 | 746<br>747 | 6.6147256<br>6.6160652 | 806<br>807 | 6.6920837<br>6.6933237 | 866         | 6.7638849              |
| 628        | 6.4425402              | 688        | 6.5337888              | 748        | 6.6174030              | 808        | 6.6945621              | 868         | 6.7650390<br>6.7661917 |
| 629        | 6.4441313              | 689        | 6.5352413              | 749        | 6.6187390              | 809        | 6.6957989              | 869         | 6.7679491              |
|            |                        |            |                        |            |                        |            |                        |             |                        |
| 630        | 6.4457198              | 690        | 6.5366916              | 750        | 6.6200732              | 810        | 6.6970342              | 870         | 6.7684932              |
| 631<br>632 | 6.4473059              | 691        | 6.5381398              | 751        | 6.6214057              | 811        | 6.6982681              | 871         | 6.7696420              |
| 633        | 6.4488894<br>6.4504704 | 692<br>693 | 6.5395860<br>6.5410300 | 752<br>753 | 6.6227363<br>6.6240652 | 812<br>813 | 6.6995003<br>6.7007311 | 872<br>873  | 6.7707894              |
| 634        | 6.4520490              | 694        | 6.5424720              | 754        | 6.6253924              | 814        | 6.7019604              | 874         | 6.7719356<br>6.7730804 |
| 635        | 6.4536250              | 695        | 6.5439118              | 755        | 6.6267177              | 815        | 6.7031881              | 875         | 6.7742239              |
| 636        | 6.4551986              | 696        | 6.5453497              | 75G        | 6.6280414              | 816        | 6.7044144              | 876         | 6.7753661              |
| 637        | 6.4567697              | 697        | 6.5467854              | 757        | 6.6293633              | 817        | 6.7056391              | 877         | 6.7765070              |
| 638        | 6.4583383              | 698        | 6.5482191              | 758        | 6.6306834              | 818        | 6.7068623              | 878         | 6.7776466              |
| 639        | 6.4509045              | 699        | 6.5496507              | 759        | 6.6320018              | 819        | 6.7080841              | 879         | 6.7787849              |
| 640        | 6.4614682              | 700        | 6.5510803              | 760        | 6.6333184              | 820        | 6.7093043              | 880         | 6.7799219              |
| 641        | G.4630295              | 701        | 6.5525079              | 761        | 6.6346334              | 821        | 6.7105231              | 881         | 6.7810576              |
| 642        | 6.4645883              | 702        | 6.5539334              | 762        | 6.6359466              | 822        | 6.7117404              | 882         | 6.7821921              |
| 643        | 6.4661447              | 703        | <b>6.</b> 5553569      | 763        | 6.6372580              | 823        | 6.7129562              | 883         | 6.7833252              |
| 644        | 6.467\$987             | 704        | 6.5567784              | 764        | 6.6385678              | 824        | 6.7141705              | 884         | 6.7844571              |
| 645        | 6.4692303              | 705        | 6.5581978              | 765        | 6.6398758              | 825        | 6.7153834              | 885         | 6.7855876              |
| 646        | 6.4707995              | 706        | 6.5596152              | 766        | 6.6411822              | 826        | 6.7165948              | 886         | 6.7867170              |
| 647<br>648 | 6.4723463              | 707        | 6.5610307              | 767        | 6.6424868              | 827        | 6.7178047              | 887         | 6.7878450              |
| 649        | 6.4738907<br>6.4754327 | 708        | 6.5624441<br>6.5638555 | 768<br>769 | 6.6437897<br>6.6450910 | 828<br>829 | 6.7190132<br>6.7202202 | 888         | 6.7889717              |
| :          |                        |            |                        |            |                        |            |                        | 889         | 6.7900972              |
| 650        | 6.4769724              | 710        | 6.5652650              | 770        | 6.6463905              | 830        | 6.7214257              | 890         | 6.7912215              |
| 651<br>652 | 6.4785096              | 711        | 6.5666724              | 771        | 6.6476884              | 831        | 6.7226298              | 891         | 6.7923444              |
| 653        | 6.4800446              | 712        | 6 5680779              | 772        | 6.6489846              | 832        | 6.7238324              | 892         | 6.7934661              |
| 654        | 6.4815771<br>6.4831074 | 713        | 6.5694814<br>6.5708850 | 773        | 6.6502790              | 833        | 6.7250336<br>6.7262334 | 893         | 6.7945866              |
| 655        | 6.4846352              | 715        | 6.5722825              | 774<br>775 | 6.6515719<br>6.6528630 | 834<br>835 | 6.7274317              | 894         | 6.7957058              |
| 656        | 6.4861608              | 716        | 6.5736802              | 776        | 6.6541525              | 836        | 6.7286286              | 89 <i>5</i> | 6.7968237              |
| 657        | 6,4876840              | 717        | 6.5750758              | 777        | 6.6554404              | 837        | 6.7298241              | 897         | 6.7979404              |
| 658        | 6.4892049              | 718        | 6.5764696              | 578        | 6.6567265              | 838        | 6.7310181              | 898         | 6.8001701              |
| 659        | 6 4907235              | 719        | 6.5778614              | 779        | 6.6580110              | 839        | 6.7322107              | 899         | 6.8012830              |
| 660        | 6.4922398              | 720        | 6.5792512              | 780        | 6.6592939              | 840        | 6.7334019              | 900         | 6.8023948              |
| 661        | 6.4937538              | 721        | 6.5806391              | 781        | 6.6605751              | 841        | 6.7345917              | 901         | 6.8035053              |
| 662        | 6.4952656              | 722        | 6.5820251              | 782        | 6.6618547              | 842        | 6.7857800              | 902         | 6.8046145              |
| 663        | 6.4967750              | 723        | 6.5834092              | 783        | 6.6631327              | 843        | 6.7369670              | 903         | 6.8057226              |
| 664        | 6.4982821              | 724        | 6.5847914              | 784        | 6.6644090              | 844        | 6.7381525              | 904         | 6.8068294              |
| 665        | 6.4997870              | 725        | 6.5861717              | 785        | 6.6656837              | 845        | 6.7393366              | 905         | 6.8079349              |
| 666<br>667 | 6.5012897<br>6.5027900 | 726        | 6.5875500              | 786        | 6.6669568              | 846        | 6.7405194              | 906         | 6.8090393              |
| 668        | 6.5042882              | 727<br>728 | 6.5889265              | 787        | 6.6682282              | 847        | 6.7417007              | 907         | 6.8101425              |
| 669        | 6.5057841              |            | 6.5903010<br>6.5916737 | 788        | 6.6694981              | 848        | 6.7428806              | 908         | 6.8112444              |
|            | 3.000,021              | . 43       | 0.0310131              | 789        | 6.6707663              | 849        | 6.7440592              | 909         | 6.8123451              |
|            |                        |            |                        |            |                        | . •        |                        |             | 4                      |

TABLE LIV.

HYPERBOLIC LOGARITHMS.

| Num. | Hyp. Log. | Num. | Hyp. Log. | Num. | Hyp. Log. | Num.      | Hyp. Log.          |
|------|-----------|------|-----------|------|-----------|-----------|--------------------|
| 910  | 6.8134446 | 934  | 6.8394764 | 958  | 6.8648478 | 982       | 6.8895913          |
| 911  | 6.8145429 | 935  | 6.8405465 | 959  | 6.8658911 | 983       | 6.8906091          |
| 912  | 6.8156400 | 936  | 6.8416155 | 960  | 6.8669333 | 984       | 6.8916259          |
| 913  | 6.8167359 | 937  | 6.8426833 | 961  | 6.8679744 | 985       | 6,8926416          |
| 914  | 6.8178306 | 938  | 6.8437499 | 962  | 6.8690145 | 986       | 6.8936564          |
| 915  | 6.8189241 | 939  | 6.8448155 | 963  | 6.8700534 | 987       | 6.8946700          |
| 916  | 6.8200164 | 940  | 6.8458799 | 964  | 6.8710913 | 988       | 6.8956827          |
| 917  | 6.8211075 | 941  | 6.8469431 | 965  | 6.8721281 | -989      | 6.8966943          |
| 918  | 6.8221974 | 942  | 6.8480053 | 966  | 6.8731638 | 990       | 6.8977049          |
| 919  | 6.8232861 | 943  | 6.8490663 | 967  | 6.8741985 | 991       | 6.8987145          |
| 920  | 6.8243737 | 944  | 6.8501262 | 968  | 6.8752321 | 992       | 6.8997231          |
| 921  | 6.8254600 | 945  | 6.8511849 | 969  | 6.8762646 | 993       | 6.9007307          |
| 922  | 6.8265452 | 946  | 6.8522426 | 970  | 6.8772961 | 994       | 6.9017372          |
| 923  | 6.8276292 | 947  | 6.8532991 | 971  | 6.8783265 | 995       | 6.9027427          |
| 924  | 6.8287121 | 948  | 6.8543545 | 972  | 6.8793558 | 996       | 6.9037473          |
| 925  | 6.8297937 | 949  | 6.8554088 | 973  | 6.8803841 | 997       | 6.9047 <i>5</i> 08 |
| 926  | 6.8308742 | 950  | 6.8564620 | 974  | 6.8814113 | 998       | 6.9057533          |
| 927  | 6.8319536 | 951  | 6.8575141 | 975  | 6.8824375 | 999       | 6.9067548          |
| 928  | 6.8330317 | 952  | 6.8585650 | 976  | 6.8834626 | 1000      | 6.9077553          |
| 929  | 6.8341087 | 953  | 6.8596149 | 977  | 6.8844867 | 10000     | 9.2103404          |
| 930  | 6.8351846 | 954  | 6.8606637 | 978  | 6.8855097 | 100000    | 11.5129255         |
| 931  | 6.8362593 | 955  | 6.8617113 | 979  | 6.8865316 | 1000000   | 13.8155106         |
| 932  | 6.8373328 | 956  | 6.8627579 | 980  | 6.8875526 | 10000000  | 16.1180957         |
| 933  | 6.8384052 | 957  | 6.8638034 | 981  | 6.8885725 | 100000000 | 18.4206807         |
|      |           |      |           |      |           |           |                    |

TABLE LV.

TO REDUCE COMMON, TO HYPERBOLIC LOGARITHMS;
AND CONVERSELY.

| Com. log. | Hyp. Log.  | Com. log | Hyp. Log.    | Com. log. | Hyp. Log.  | Com. log. | Hyp. Log.  |
|-----------|------------|----------|--------------|-----------|------------|-----------|------------|
| 000       | 0.00000000 | 025      | 0.57564627   | 050       | 1.15129255 | 075       | 1.72693882 |
| 001       | 0.02302585 | 026      | 0.59867213   | 051       | 1.17431840 | 076       | 1.74996467 |
| 002       | 0.04605170 | 027      | 0.62169798   | 052       | 1.19794425 | 077       | 1.77299052 |
| 003       | 0.06907755 | 028      | 0.64472383   | 053       | 1.22037010 | 078       | 1.79601637 |
| 004       | 0.09210340 | 029      | 0.66774968   | 054       | 1.24339595 | 079       | 1.81904222 |
| 005       | 0.11512925 | 030      | 0.69077553   | 055       | 1.26642180 | Ó80       | 1.84206807 |
| 006       | 0.13815510 | 031      | 0.71380138   | 056       | 1.28944766 | 081       | 1.86509392 |
| 007       | 0.16118096 | 032      | 0.73682723   | 057       | 1.31247351 | 082       | 1.88811977 |
| 008       | 0.18420681 | -033     | 0.75985308   | 058       | 1.33549936 | 083       | 1.91114562 |
| 009       | 0.20723266 | 034      | 0.78287893   | 059       | 1.35852521 | 084       | 1.93417147 |
| 010       | 0.23025851 | 035      | 0.80590478   | 060       | 1.38155106 | 085       | 1.95719732 |
| 011       | 0.25328436 | 036      | 0.82893064   | 061       | 1.40457691 | · 086     | 1.98022318 |
| 012       | 0.27631021 | 037      | 0.85195649   | 062       | 1.42760276 | 087       | 2.00324909 |
| 013       | 0.29933606 | 038      | 0.87498234   | 063       | 1.45062861 | 088       | 2.02627488 |
| 014       | 0.32236191 | 039      | 0.89800819   | 064       | 1.47365446 | 089       | 2.04930073 |
| 015       | 0.34538776 | 040      | 0.92103404   | 065       | 1.49668031 | 090       | 2.07232658 |
| 016       | 0.36841362 | 041      | 0.94405989   | 066       | 1.51970617 | 091,      | 2.09535243 |
| 017       | 0.39143947 | 042      | 0.96708574   | 067       | 1.54273202 | 092       | 2.11837828 |
| 018       | 0.41446532 | 043      | 0.99011159   | 068       | 1.56575787 | 093       | 2.14140413 |
| 019       | 0.43749117 | 044      | 1.01313744   | 069       | 1.58878372 | 094       | 2.16442998 |
| 020       | 0.46051702 | 045      | 1.03616329   | 070       | 1.61180957 | 095       | 2.18745583 |
| 021       | 0.48354287 | 046      | 1.05918915   | 071       | 1.63483542 | 096       | 2.21048169 |
| . 023     | 0.50656872 | 047      | 1.08221500   | 072       | 1.65786127 | 097       | 2.23350754 |
| O23       | 0.52959457 | 048      | 1.10524085   | 073       | 1.68088712 | 098       | 2.25653339 |
| O24       | 0.55262042 | 049      | 1.12826670 l | 074       | 1.70391297 | 099       | 2.27955924 |

TABLE LV.
TO REDUCE COMMON, TO HYPERBOLIC LOGARITHMS;
AND CONVERSELY.

| Com.       |                          | Com.       | . 1  | Com.       | 1                                 | Com.       |                          | Com        |                          |
|------------|--------------------------|------------|--|------------|-----------------------------------|------------|--------------------------|------------|--------------------------|
| Log.       | Hyp. Log.                | Log.       | Hyp. Log.                                  | Log.       | Hyp. Log.                         | Log        | Hyp. Log.                | Log.       | Hyp. Log.                |
| 100        | 2.30258509               | 160        | 3.68413615                                 | 220        | 5.06568721                        | 280        | 6.44723826               | 340        | 7.82878932               |
| 101        | 2.32561094               |            | 3.70716200                                 | 221        | 5.08871306                        | 281        | 6.47026411               | 341        | 7.85181517               |
| 102        | 2.34863679               | 162        | 3.73018785                                 | 222        | 5.11173891                        | 282        | 6.49328996               | 342        | 7.87484102               |
| 103        | 2.37166264               | 163        | 3.75321370                                 | 223        | 5.13476476                        | 283        | 6.51631581               | 343        | 7.89786687               |
| 104        | 2.39468849               | 164        | 3.77623955                                 | 224        | 5.15779061                        | 284        | 6.53934166               | 344        | 7.92089272               |
| 105        | 2.41771484               | 165        | 3.79926540                                 | 225        | 5.18081646                        | 285        | 6.56236751               | 345        | 7.94391857               |
| 106        | 2.44074020               | 166        | 3.82229126                                 | 226        | 5.20384232                        | 286        | 6.58539337               | 346        | 7.96694443               |
| 107        | 2.46376605               | 167        | 3.84531711                                 | 227        | 5.22686817                        | 287        | 6.60841922               | 347        | 7.98997028               |
| 108        | 2.48679190               | 168        | 3.86834296                                 | 228        | 5.24989402                        | 288        | 6.63144507               | 348        | 8.01299613               |
| 109        | 2.50981775               | 169        | 3.89136881                                 | 229        | 5.27291987                        | 289        | 6.65447099               | 349        | 8.03602198               |
| 110        | 2.53284360               | 170        | 3.91439466                                 | 230        | 5.29594572                        | 290        | 6.67749677               | 350        | 8.05904783               |
| 111        | 2.55586945               | 171        | 3.93742051                                 | 231        | 5.31897157                        | 291        | 6.70052262               | 351        | 8.08277368               |
| 112        | 2.57889530               | 172        | 3.96044636                                 | 232        | 5.34199742                        | 292        | 6.72354847<br>6.74657435 | 352        | 8.10509953               |
| 113        | 2.60192115               | 173        | 3.98347221                                 | 233        | 5.36502327                        | 293        | 6.76963017               | 353        | 8.12812538               |
| 114        | 2.62194700               | 174<br>175 | 4.00649806<br>4.02952891                   | 234<br>235 | 5.38804912<br>5.41107 <b>4</b> 97 | 294<br>295 | 6.79262602               | 354<br>355 | 8.15115123<br>8.17417708 |
| 115        | 2.64797285               | 176        | 4.05254976                                 | 236        | 5.43410083                        | 296        | 6.8156518s               | 356        | 8.19720293               |
| 116        | 2.67099871<br>2.69402456 | 177        | 4.03234976                                 | 237        | 5.45712668                        | 297        | 6.83867778               | 357        | 8.22022878               |
| 118        | 2.71705041               | 178        | 4.09860146                                 | 238        | 5.48015253                        | 298        | 6.86170358               | 358        | 8.24325463               |
| 119        | 2.74007626               | 179        | 4.12162731                                 | 239        | 5.50317838                        | 299        | 6.88472943               | 359        | 8.26628048               |
| 120        | 2.76310211               | 180        | 4.14465316                                 | 240        | 5.52620423                        | 300        | 6.90775528               | 560        | 8.28930633               |
| 120        | 2.78612796               | 181        | 4.16767901                                 | 241        | 5.54923008                        | 301        | 6.93078113               | 361        | 8.31233218               |
| 132        | 2.80015381               | 182        | 4.19070486                                 | 242        | 5.57225593                        | 302        | 6.95380698               | 562        | 8.33535803               |
| 123        | 2.83217966               | 183        | 4.21373071                                 | 243        | 5.59528178                        | 303        | 6.97683283               | 363        | 8.35838388               |
| 124        | 2.85520551               | 184        | 4.23675656                                 | 244        | 5.61830763                        | 304        | 6.99985868               | 364        | 8.38140973               |
| 125        | 2.87823136               | 1          | 4.25978241                                 | 245        | 5.64133348                        | 305        | 7.02288453               | 365        | 8.40443558               |
| 126        | 2.90125722               |            | 4.28280827                                 | 246        | 5.66435934                        | 306        | 7.04591039               | 366        | 8.42746144               |
| 127        | 2.92428307               | 187        | 4.30583412                                 | 247        | 5.68738519                        | 307        | 7.06893624               | 367        | 8.45048729               |
| 128        | 2.94730892               | 188        | 4.32885997                                 | 248        | 5.71041104                        | 308        | 7.09196209               | 368        | 8.47351314               |
| 129        | 2.97033477               | 189        | 4.35188582                                 | 249        | 5.73343689                        | 309        | 7.11498794               | 369        | 8.49653899               |
| 130        | 2.99336062               | 190        | 4.37491167                                 |            | 5,75646274                        | 310        | 7.13801379               | 370        | 8.51956484               |
| 131        | 3.01638647               | 191        | 4.39798752                                 | 251        | 5.77948859                        | 311        | 7.16103964               | 371        | 8.54259009               |
| 132        | 3.03941232               | 192        | 4.42096357                                 | 252        | 5.80251444                        | 312        | 7.18406549               | 372        | 8.56561654               |
| 133        | 5.06243817               | 193        | 4.44398922                                 | 253        | 5.82554029                        | 313        | 7.20709134               | 373        | 8.588G4259               |
| 134        | 3.08546402               | 191        | 4.46701507                                 | 254        | 5.84856614                        | 314        | 7.23011719               | 374        | 8.61166824               |
| 135        | 3.10848987               | 195        | 4.49004092                                 | 255        | 5.87159199                        | 315        | 7.25314304               | 375        | 8.63469409               |
| 133        | 3.13151573               | 196        | 4.51306678                                 | 256        | 5.89461784                        | 316        | 7.27616890               | 376        | 8.65771995               |
| 137        | 3.15454158               | 197        | 4.53603263                                 | 257        | 5.91764369<br>5.94066954          | 317        | 7.29919475<br>7.32222060 | 377        | 8.68074580<br>8.70377165 |
| 198        | S.1775674S               | 198        | 4.55911848                                 | 258<br>259 | 5.96369539                        | 318        | 7.34524645               | 379        | 8.72679750               |
| 139        | 3.25059328               | 199        | 4.58214433                                 |            |                                   |            |                          |            |                          |
| 140        | S.22361913               | 200        | 4.60517019                                 | 260        | 5.98672124                        | 320        | 7.36827230               | 380        | 8.74982335               |
| 141        | 3.24664498               | 201        | 4.62819604                                 | 261        | 6.00974709                        | 321        | 7.39129815               | 381        | 8.77284920               |
| 142        | 8.26967083               | 202        | 4.65122189                                 | 262        | 6.03277294                        | 322        | 7.41432400               | 382        | 8.79587505               |
| 143        | 5.29269668               | 203        | 4.67424774                                 | 263        | 6.05579879                        | 328        | 7.43734985               | 383        | 8.81890090<br>8.84192675 |
| 144        | 8.81572258               | 204        | 4.69727359                                 | 264        | 6.07882464<br>6.10185049          | 324        | 7.46037570<br>7.48430155 | 384<br>685 | 8.86495260               |
| 145        | 3.33874838               | 205        | 4.7202 <b>9</b> 944<br>4.7 <b>4332</b> 530 | 265<br>266 | 6.10183049                        | 326        | 7.50642741               | 386        | 8.88797846               |
| 146        | 3.36177424               | 200        | 4.74332330                                 | 267        | 6.14790220                        | 320        | 7.52945326               | 387        | 8.91100431               |
| 147<br>148 | 3.40782594               | 207        | 4.78937700                                 | 268        | 6.17092805                        | 328        | 7.55247911               | 388        | 8.93403016               |
| 148        | 9.43085179               | 209        | 4.81240285                                 | 269        | 6.19395390                        | 329        | 7.57550496               | 389        | 8.95705601               |
| 150        | 3.45387764               | 210        | 4.83542870                                 | 270        | 6.21697975                        | 330        | 7.59853081               | 390        | 8.98008186               |
| 150        | 3.47690349               | 11         | 4.85845455                                 | 271        | 6.24000560                        | 331        | 7.62155666               | 391        | 9.00310771               |
| 152        | 3,49992934               | . 1        | 4.88148040                                 | 272        | 6.26303145                        | 332        | 7.64458251               | 392        | 9.02613356               |
| 153        | 3.52295519               | 213        | 4.90450625                                 | 273        | 6.28605730                        |            | 7.66760836               | 393        | 9.04915941               |
| 154        | 3,54598104               | 914        | 4.92753210                                 | 274        | 6.30908315                        | 994        | 7.69063421               | 394        | 9.07218526               |
| 155        | 3.56900689               | 215        | 4.95055795                                 | 275        | 6.33210900                        | 885        | 7.71366006               | 395        | 9.09521111               |
| 156        | 3.59203275               | 216        | 4.97358381                                 | 276        | 6.35513486                        |            | 7.73668592               | 396        | 9.11823697               |
| 157        | 3.61505860               | 217        | 4.99660966                                 | 277        | 6.37816071                        | 337        | 7.75971177               | 397        | 9.14126282               |
| 1.58       | 3.63808445               | 218        | 5.01963551                                 | 278        | 6.40118656                        | 338        | 7.78273762               | . 398      | 9.16428867               |
| 159        | 3.66111030               | 219        | 5.04266136                                 | 279        | 6.42421241                        | 339        | 7.80576547               | 399        | 9.18731452               |
|            |                          |            |  |            |                                   |            |                          |            |                          |

## TABLE LV.

# TO REDUCE COMMON, TO HYPERBOLIC LOGARITHMS; AND CONVERSELY.

|            | AND CONVERSELY.                                       |            |                            |            |                                    |            |                                     |             |  |  |  |
|------------|---|------------|----------------------------|------------|------------------------------------|------------|-------------------------------------|-------------|--|--|--|
| Com.       | 1   | Com.       | 1                          | Com.       |                                    | Com        | .                                   | Com.        |  |  |  |
| Log.       | Hyp. Log.   | Log.       | Hyp. Log.                  | Log.       | Hyp. Log.                          | Log        | Hyp. Log.                           | Log.        | Hyp. Log.                                    |  |  |
| 400        | 9 21034037  | 460        | 10.59189142                | 520        | 11.97344248                        | 580        | 13.35499354                         | 640         | 14.73654460                                  |  |  |
| 401        | 9.23336622  | 461        | 10.61491727                | 521        | 11.99646833                        | 581        | 13.37801939                         | 641         | 14.75957045                                  |  |  |
| 402        | 9.25639207  | 462        | 10.63794312                | 522        | 12.01949418                        | 582        | 13.40104524                         | 642         | 14.78259630                                  |  |  |
| 403        | 9.27941792  | 463        | 10.66096897                | 523        | 12.04252003                        | 583        | 13.42407109                         | 643         | 14.80562215                                  |  |  |
| 404        | 9.30244377  | 464        | 10.68399482                | 524        | 12.06554588                        | 584        | 13.44709694                         | 644         | 14.82864800                                  |  |  |
| 405        | 9.32546962  | 465        | 10.70702067                | 525        | 12.08857173                        | 585        | 13.47012279                         | 645         | 14.85167385                                  |  |  |
| 406        | 9.34849548  | 466        | 10.73004653                | 526        | 12.11159759<br>12.13462344         | 586<br>587 | 13.49314865<br>13.51617450          | 646<br>647  | 14.87469971<br>14.89772556                   |  |  |
| 408        | 9.39454718  | 468        | 10.75307238<br>10.77609823 | 527<br>528 | 12.15764929                        | 588        | 13.53920035                         | 648         | 14.92075141                                  |  |  |
| 409        | 9.41757303  | 469        | 10.79912408                | 529        | 12.18067514                        | 589        | 13.56222620                         | 649         | 14.94377726                                  |  |  |
|            |   |            |                            |            |                                    |            |                                     |             |  |  |  |
| 410        | 9.44059888<br>9.46362473                              | 470        | 10.82214993                | 530        | 12.20370099<br>12.22672684         | 590<br>591 | 13.58525205                         | 650<br>651  | 14.96680311<br>14.98982896                   |  |  |
| 412        | 9.48665058  | 471<br>472 | 10.84517578<br>10.86820163 | 531<br>532 | 12.22672669                        | 591        | 13.60827790<br>13.63130375          | 652         | 15.01285481                                  |  |  |
| 413        | 9.50967643  | 473        | 10.89122748                | 533        | 12.27277854                        | 593        | 13.65482960                         | 653         | 15.03588066                                  |  |  |
| 414        | 9.53270228  | 474        | 10.91425333                | 534        | 12.29850459                        | 594        | 13.67735545                         | 654         | 15.05890651                                  |  |  |
| 415        | 9.55572813  | 475        | 10.93727918                | 535        | 12.31883024                        | 595        | 13.70038130                         | 655         | 15.08193236                                  |  |  |
| 416        | 9.57875398  | 476        | 10.96080504                | 536        | 12.34185610                        | 596        | 13.72340716                         | 656         | 15.10495821                                  |  |  |
| 417        | 9.60177984  | 477        | 10.98333089                | 537        | 12.36488195                        | 597        | 13.74643301                         | 657         | 15.12798406                                  |  |  |
| 418        | 9.62480569  | 473        | 11.00635674                | 538        | 12.38790780                        | 598        | 13.76945886                         | 658         | 15.15100991                                  |  |  |
| 419        | 9.64783154  | 479        | 11.02938259                | 539        | 12.41093365                        | 599        | 13.79248471                         | 659         | 15.17403576                                  |  |  |
| 420        | 9.67085739  | 480        | 11.05240844                | 540        | 12.43395950                        | 600        | 13.81551056                         | 660         | 15.19706161                                  |  |  |
| 421        | 9.69388324  | 481        | 11.07548429                | 541        | 12.45698535                        | 601        | 13.83853641                         | 661         | 15.22008746                                  |  |  |
| 422        | 9.71690909  | 482        | 11.09846014                | 542        | 12.48001120                        | 602        | 13.86156226                         | 662         | 15.24311331                                  |  |  |
| 423<br>424 | 9.73993494  | 483        | 11.12148599                | 543        | 12.50303705                        | 603        | 13.88458811                         | 663         | 15.26613916                                  |  |  |
| 425        | 9.76296079<br>9.78598664                              | 484        | 11.14451184                | 544<br>545 | 12.52606290<br>12.54908875         | 604        | 13.90761396<br>13.93063981          | 664<br>665  | 15.28916501<br>15.31219086                   |  |  |
| 426        | 9.80901250  | 486        | 11.19056355                | 546        | 12.57911461                        | 606        | 13.95366567                         | 666         | 15.33521672                                  |  |  |
| 427        | 9.83203835  | 487        | 11.21358940                | 547        | 12.59514046                        | 607        | 13.97669152                         | 667         | 15.35824257                                  |  |  |
| 428        | 9.85506420  | 488        | 11.23661525                | 548        | 12.61816631                        | 608        | 13.99971737                         | 668         | 15.38126842                                  |  |  |
| 429        | 9.87809005  | 489        | 11.25964110                | 549        | 12.64119216                        | 609        | 14.02274322                         | 669         | 15.40429427                                  |  |  |
| 430        | 9.90111590  | 490        | 11.28266695                | 550        | 12.66421801                        | 610        | 14.04576907                         | 670         | 15.42732012                                  |  |  |
| 431        | 9.92414175  | 491        | 11.30569280                | 551        | 12.68724386                        | 611        | 14.06879492                         | 671         | 15.45034597                                  |  |  |
| 432        | 9.94716760  | 492        | 11.32871865                | 552        | 12.71026971                        | 612        | 14.09182077                         | 672         | 15.47937182                                  |  |  |
| 433        | 9.97019345  | 493        | 11.35174450                | 553        | 12.73329556                        | 613        | 14.11484662                         | 673         | 15.49639767                                  |  |  |
| 434        | 9.99321930  | 494        | 11.37477035                | 554        | 12.75632141                        | 614        | 14.13787247                         | 674         | 15.51942352                                  |  |  |
| 435        | 10.01624515   | 495        | 11.39779620                | 555        | 12.77934726                        | 615        | 14.16089832                         | 675         | 15.54244937                                  |  |  |
| 436<br>437 | 10.03927101<br>10.06229686                            | 496        | 11.42082206<br>11.44384791 | 556<br>557 | 12.80237312                        | 616        | 14.18392418<br>14.20695003          | 676<br>677  | 15.56 <b>547</b> 523<br>15.588 <b>5</b> 0108 |  |  |
| 438        | 10.00229080   | 497        | 11.46687376                | 558        | 12.82539 <b>897</b><br>12.84842482 | 618        | 14.22997588                         | 678         | 15.61152693                                  |  |  |
| 439        | 10.10834856   | 499        | 11.48989961                | 559        | 12.87145067                        | 619        | 14.25300173                         | 679         | 15.63455278                                  |  |  |
| 440        | 13 1010544  |            |                            |            |                                    | <u> </u>   |                                     |             |  |  |  |
| 440<br>441 | 10.13137441   | 500        | 11.51292546                | 560        | 12.89447652                        | 620        | 14.27602758                         | 680         | 15.65757863                                  |  |  |
| 442        | 10.15440026<br>10.17742611                            | 501<br>502 | 11.55595131<br>11.55897716 | 561<br>562 | 12.91750237<br>12.94052822         | 621<br>622 | 14.2990 <b>5</b> 343<br>14.32207928 | 681<br>682  | 15.68060448<br>15.70868033                   |  |  |
| 443        | 10.20045196   | 503        | 11.58200301                | 563        | 12.96355407                        | 623        | 14.34510513                         |             | 15.72665618                                  |  |  |
| 444        | 10.22347781   | 504        | 11.60502886                | 564        | 12.98657992                        | 624        | 14.36813098                         |             | 15.74968203                                  |  |  |
| 445        | 10.24650366   | 505        | 11.62805471                | 565        | 13.00960577                        | 625        | 14.39115683                         | 685         | 15.77270788                                  |  |  |
| 446        | 10.26952952   | 506        | 11.65108057                | 566        | 13.03263163                        | 626        | 14.41418269                         | 68 <b>6</b> | 15.79573374                                  |  |  |
| 447        | 10.29255537   | 507        | 11.67410642                | 567        | 13.05565748                        | 627        | 14.43720854                         | 687         | 15.81875959                                  |  |  |
| 448<br>449 | 10.31 <i>55</i> 81 <i>2</i> 2<br>10.33 <b>86070</b> 7 | 508        | 11.69713227                | 568        | 13.07868933                        | 628        | 14.46023489<br>14.48326024          |             | 15.84178544<br>15.86481129                   |  |  |
|            |   | 509        | 11.72015812                | 569        | 13.10170918                        | 029        | 11.10.)20024                        |             | 13.00101129                                  |  |  |
| 450        | 10.36163292   | 510        | 11.74318397                | 570        | 15.12473503                        | 630        | 14.50628609                         |             | 15.88783714                                  |  |  |
| 451        | 10.38465877   | 511        | 11.76620982                | 574        | 13.14776088                        | 631        | 14.52931194                         |             | 15.91086299                                  |  |  |
| 452        | 10.40768462   | 512        | 11.78923567                | 572        | 13.17078673                        | 632        | 14.55238779                         |             | 15.93388884                                  |  |  |
| 453<br>454 | 10.43071047<br>10.45373632                            | 518<br>514 | 11.81226152<br>11.83528737 | 573<br>574 | 13.19381258<br>13.21683843         | 633<br>634 | 14.57536364<br>14.59838949          | 693<br>694  | 15.95691469<br>15.97994054                   |  |  |
| 455        | 10.47676217   | 515        | 11.85831322                | 575        | 13.23986428                        | 635        | 14.62141534                         | 695         | 16.00296629                                  |  |  |
| 456        | 10.49978802   | 516        | 11.88133908                | 576        | 13.26289014                        | 636        | 14.64444120                         | 696         | 16.02599225                                  |  |  |
| 457        | 10.52281387   | 517        | 11.90436493                | 577        | 13.28591599                        | 637        | 14.66746705                         | 697         | 16.04901810                                  |  |  |
| 458        | 10.54583972   | 518        | 11.92739078                | 578        | 13.30894184                        |            | 14.69049290                         | 698         | 16.07204995                                  |  |  |
| 459        | 110.56886557  | 519        | 11.95041663                | 579        | 113,33196769                       | 639        | 14.71351875                         | 699         | 16.09506980                                  |  |  |
|            |   |            |                            |            |                                    |            |                                     |             |  |  |  |

### TABLE LV.

# TO REDUCE COMMON, TO HYPERBOLIC LOGARITHMS; AND CONVERSELY.

| om.          | · · · · · · · · · · · · · · · · · · · | Com.       | 1                          | Com        | 1                          | Com        | ./                         | (Com.      | ·                          |
|--------------|---------------------------------------|------------|----------------------------|------------|----------------------------|------------|----------------------------|------------|----------------------------|
| Log.         | Hyp. Log.                             | Log.       | Hyp. Log.                  | Log.       | Hyp. Log.                  | Log        |                            | Log.       | Hyp. Log.                  |
| 700          | 16.11809565                           | 760        | 17.49964670                | 820        | 18.88113776                | 880        | 20.26274882                | 940        | 21.64429988                |
| 701          | 16.14112150                           | 761        | 17.52267255                | 821        | 18.90422361                | 881        | 20.28577467                | 941        | 21.66732573                |
| 702          | 16.16414735                           | 762        | 17.54569840                | 822        | 18.92724946                | 882        | 20.30880052                | 942        | 21.69035158                |
| 703          | 16.18717320                           | 763        | 17.56872425                | 823        | 18.95027531                | 883        | 20.33182637                | 943        | 21.71337743                |
| 704          | 16.21019905                           | 764        | 47.59175010                | 824        | 18.99330116                | 884        | 20.35485222                | 944        | 21.73640328                |
| 705          | 16.23322490                           | 765        | 17.61477595                | 825        | 18.99632701                | 885,       | 20.37787808                | 945        | 21.75942913                |
| 706          | 16.25625076                           | 766        | 17.63870681                | 826        | 19.01935287                | 886        | 20.40090393                | 946        | 21.78245499                |
| 707          | 16.27927661                           | 767        | 17.66082766                | 827        | 19.04237872                | 887        | 20.42392978                | 947        | 21.80548084                |
| 708,         | 16.30230246                           | 768        | 17.68385351                | 828        | 19.06540457                | 888        | 20.44695563                | 948        | 21.82850669                |
| 709          | 16.32532831                           | 769        | 17.70687936                | 829        | 19.08843042                | 889        | 20.46998148                | 949        | 21.85153254                |
| 710          | 16.34835416                           | 770        | 17.72990521                | 830        | 19.11145627                | 890        | 20.49300733                | 950        | 21.87455839                |
| 711          | 16.37138001                           | 771        | 17.75293106                | 831        | 19.13448212                | 891        | 20.51603318                | 951.       | 21.89758424                |
| 712          | 16.39440586                           | 772        | 17.77595691                | 832        | 19.15750797                | 892        | 20.53905903                | 952        | 21.92061009                |
| 713          | 16.41743171                           | 773        | 17.79898276                | 833        | 19.18053382                | 893        | 20.56208488                | 953        | 21.94363594                |
| 714          | 16.44045756                           | 774        | 17.82200861                | 834        | 19.20355967                | 894        | 20.58511073                | 954        | 21.96666179                |
| 715          | 16.46348341                           | 775        | 17.84503 <del>44</del> 6   | 835        | 19.22658552                | 895        | 20.60813658                | 955        | 21.98968764                |
| 716          | 16.48650927                           | 776        | 17.86806032                | 836        | 19.24961138                | 896        | 20.63116244                | 956        | 22.01271349                |
| 717          | 16.50953512                           | 777        | 17.89108617                | 837        | 19.27263723                | 897        | 20.65418829                | 957        | 22.03573934                |
| 718          | 16.53256097                           | 778        | 17.91411202                | 838        | 19.29566308                | 898        | 20.67721414                | 958        | 22.05876519                |
| 719          | 16.55558682                           | 779        | 17.93713787                | 839        | 19.31868893                | 899        | 20.70023999                | 959        | 22.08179104                |
| 720          | 16.57861267                           | 780        | 17.96016372                | 840        | 19.34171478                | 900        | 20.72326584                | 960        | 22.10481689                |
| 721          | 16.60163852                           | 781        | 17.98318957                | 841        | 19.36474063                | 901        | 20.74629169                | 961        | 22.12784274                |
| 722          | 16.62466437                           | 782        | 18.00621542                | 842        | 19.38776648                | 902        | 20.76931754                | 962        | 22.15086859                |
| 723          | 16.64769022                           | 783        | 18.02924127                | 843        | 19.41079233                | 903        | 20.79234339                | 963        | 22.17389444                |
| 724          | 16.67071607                           | 784        | 18.05226712                | 844        | 19.43381818                | 904        | 20.81536924                | 964        | 22.19692029                |
| 725<br>726   | 16.69374192<br>16.71676778            | 785        | 18.07529297<br>18.09831883 | 845<br>846 | 19.45684403                | 905<br>906 | 20.83839509<br>20.86142095 | 965<br>966 | 22.21996614<br>22.24297200 |
| 727          | 16.73979363                           | 786<br>787 | 18.12184468                | 847        | 19.47986989<br>19.50289574 | 907        | 20.88444680                | 967        | 22.26599785                |
| 728          | 16.76281948                           | 788        | 18.14437053                | 848        | 19.52592159                | 903        | 20.90747265                | 968        | 22.28902370                |
| 729          | 16.78584533                           | 789        | 18.16739638                | 849        | 19.54894744                | 909        | 20.93049850                | 969        | 22.31204955                |
| 730          | 16.80887118                           | 790        | 18.19042223                | 850        | 19.57197329                | 910        | 20.95352435                | 970        | 22.33507540                |
| 731          | 16.83189703                           | 791        | 18.21344808                | 851        | 19.59499914                | 911        | 20.97655020                | 971        | 22.35810125                |
| 732          | 16.85492288                           | 792        | 18.23647393                | 852        | 19.61802499                | 912        | 20.99957605                | 972        | 22.38112710                |
| 733          | 16 87794873                           | 793        | 18.25949978                | 853        | 19.64105084                | 913        | 21.02260190                | 973        | 22.40415295                |
| 734          | 16.90097458                           | 794        | 18.28252563                | 854        | 19.66407669                | 914        | 21.04562775                | 974        | 22.42717880                |
| 735          | 16.92400048                           | 795        | 18.30555148                | 855        | 19.68710254                | 915        | 21.06865360                | 975        | 22.45020465                |
| 736          | 16.94702629                           | 796        | 18.32857734                | 856        | 19.71012840                | 916        | 21.09167946                | 976        | 22.47323051                |
| 737          | 16.97005214                           | 797        | 18.35160319                | 857        | 19.73315425                | 917        | 21.11470581                | 977        | 22.49625636                |
| 738          | 16.99307799                           | 798        | 18.37462904                | 858        | 19.75618010                | 918        | 21.13773116                | 978        | 22.51928221                |
| 739          | 17.01610384                           | 799        | 18.39765489                | 859        | 19.77920595                | 919        | 21.16075701                | 979        | 22.54230806                |
|              | 17.03912969                           | 800        | 18.42068074                | 860        | 19.80223180                | 920        | 21.18378286                | 980        | 22.56533391                |
| 741          | 17.06215554                           | 801        | 18.44370659                | 861        | 19.82525765                | 921        | 21.20680871                | 981        | 22.58835976                |
| 742          | 17.08518139                           | 802        | 18.46673244                | 862        | 19.84828350                | 922        | 21.22983456                | 982        | 22.61138561                |
| 743          | 17.10820724                           | 803        | 18.48975829                | 863        | 19.87130955                | 923        | 21.25286041                | 983        | 22.63441146                |
| 744<br>745   | 17.13123309                           | 804        | 18.51278414                | 864        | 19.89433520                | 924        | 21.27588626                | 984<br>985 | 22.65743731                |
| 746          | 17.15425894<br>17.17728480            | 805<br>806 | 18.53588999<br>18.55883585 | 865<br>866 | 19.91736105<br>19.94038691 | 925<br>926 | 21.29891211<br>21.32193797 | 986        | 22.68046316<br>22.70348902 |
| 747          | 17.17728480                           | 807        | 18.58186170                | 867        | 19.94038691                | 920        | 21.32193797                | 987        | 22.72651487                |
| 748          | 17.22333650                           | 808        | 18.60488755                | 868        | 19.98643861                | 928        | 21.36798967                | 988        | 22.74954072                |
| 749          | 17.24636235                           | 809        | 18.62791340                | 869        | 20.00946446                | 929        | 21.39101552                | 989        | 22.77256657                |
| 750          | 17.26938820                           | 810        | 18.65093925                | 870        | 20.03249031                | 930        | 21.41404137                | 990        | 22.79559242                |
| 751          | 17.29241405                           | 811        | 18.67396510                | 871        | 20.05551616                | 981        | 21.43706722                | 991        | 22.81861827                |
| 752          | 17.31543990                           | 812        | 18.69699095                | 872        | 20.07854201                | 932        | 21.46009307                | 992        | 22.84164412                |
| 7 <i>5</i> 3 | 17.33846575                           | 813        | 18.72001680                | 873        | 20.10156786                | 933        | 21.48311892                | 993        | 22.86466997                |
|              | 17.36149160                           | 814        | 18.74304265                | 874        | 20.12459371                | 984        | 21.50614477                | 994        | 22.88769582                |
|              | 17.98451745                           | 815        | 18.76606850                | 875        | 20.14761956                | 935        | 21.52917062                |            | 22.91072167                |
|              | 17.40754830                           | 816        | 18.78909495                | 876        | 20.17064542                | 936        | 21.55219648                | 996        | 22.93374753                |
|              | 17.45056915                           | 817        | 18.81212021                | 877        | 20.19367127                | 937        | 21.57522233                | 997        | 22.95677938                |
|              | 17.45359500<br>17.47662085            | 818        | 18.83514606                | 878        | 20.21669712                | 938        | 21.59824818                | 998        | 22.97979923                |
| 105 (        | 11.71002003                           | 019        | 18.85817191                | 1019       | 20.23972297                | 939        | 21.62127403                | 999        | 23.00282508                |
|              |                                       |            | <u> </u>                   |            |                            |            |                            |            |                            |

TABLE LVI.

## LENGTHS OF CIRCULAR ARCHES.

| Deg. | Arch.                  | Deg.            | Arch.     | Deg.       | Arch.                  | Min.     | Arch.          | Sec.        | Arch.        | Third    | Arch     |
|------|------------------------|-----------------|-----------|------------|------------------------|----------|----------------|-------------|--------------|----------|----------|
| 1    | 0.0174533              | 61              | 1.0646508 | 121        | 2.1118483              | <u> </u> | 2909           | <del></del> |              |          |          |
| 2    | 0.0349066              | 62              | 1.0821041 | 122        | 2.1293016              | 2        | 5818           | 1 2         | 48<br>97     | 1 2      | 1 2      |
| 3    | 0.0523599              | 63              | 1.0995574 | 123        | 2.1467549              | 3        | 8727           | 3           | 145          | 3        | 2        |
| 4    | 0.0698132              | 64              | 1.1170107 | 124        | 2.1642082              | 4        | 11636          | 4           | 194          | 4        | 3        |
| 5    | 0.0872665              | 65              | 1.1344640 | 125        | 2.1816615              | 5        | 14544          | 5           | 242          | 5        | 4        |
| 6    | 0.1047198              | 66              | 1.1519173 | 126        | 2.1991148              | 6        | 17453          | 6           | 291          | 6        | 5        |
| 7    | 0.1221730              | 67              | 1.1693706 | 127        | 2.2165681              | 7        | 20362          | 7           | 339          | 7        | 6        |
| 8    | 0.1396263              | 68              | 1.1868239 | 128        | 2.2340214              | 8        | 23271          | 8           | 388          | 8        | 6        |
| 9    | 0.1570796              | 69              | 1.2042772 | 129        | 2.2514747              | 9        | 26180          | 9           | 436          | 9        | 7        |
| 10   | 0.1745329              | 70              | 1.2217305 | 130        | 2.2689280              | 10       | 29089          | 10          | 485          | 10       | 8        |
| 11   | 0.1010000              | - <del></del> - |           |            | 0.0000010              |          |                |             | <u> </u>     |          | <b></b>  |
| 12   | 0.1919862              | 71              | 1.2391838 | 131        | 2.2863813              | 11       | 31998          | 11          | 533          | 11       | 9        |
| 13   | 0.2094395<br>0.2268928 | 72<br>73        | 1.2566371 | 132        | 2.3038346              | 12       | 84907          | 12          | ` 582        | 12       | 10       |
| 14   |                        | 74              | 1:2740904 | 133        | 2.3212879              | 13       | 3781 <i>5</i>  | 13          | 630          | 13       | 11       |
| 15   | 0.2443461              | 75              | 1.2915436 | 134        | 2.3387412              | 14       | 40724          | 14          | 679          | 14       | 11       |
| 16   | 0.2617994<br>0.2792527 | 76              | 1.3089969 | 135        | 2.3561945              | 15       | 43633          | 15          | 727          | 15       | 12       |
| 17   | 0.2967060              | 77              | 1.3264502 | 136        | 2.3736478              | 16       | 46542          | 16          | 776          | 16       | 13       |
| 18   |                        |                 | 1.3439035 | 137        | 2.3911010              | 17       | 49451          | 17          | 824          | 17       | 14       |
| 19   | 0.3141593<br>0.3316126 | 78<br>79        | 1.3613568 | 138        | 2.4085543              | 18       | 52360          | 18          | 873          | 18       | 15       |
| 20   | 0.3490659              | 80              | 1.3788101 | 139<br>140 | 2.4260076<br>2.4434609 | 19<br>20 | 55269          | 19          | 921          | 19       | 15       |
|      | 0.0130039              |                 | 1.0902034 | 140        | 2.7734009              | 20       | 58178          | 20          | 970          | 20       | 16       |
| 21   | 0.3665191              | 81              | 1.4137167 | 141        | 2.4609142              | 21       | 61087          | 21          | 1018         | 21       | 17       |
| 22   | 0.3839724              | 82              | 1.4311700 | 142        | 2.4783675              | 22       | 63995          | 22          | 1067         | 22       | 18       |
| 23   | 0.4014257              | 83              | 1.4486233 | 143        | 2.4958208              | 23       | 66904          | 23          | 1115         | 23       | 19       |
| 24   | 0.4188790              | 84              | 1.4660766 | 144        | 2.5132741              | 24       | 69813          | 24          | 1164         | 24       | 19       |
| 25   | 0.4363323              | 85              | 1.4835299 | 145        | 2.5307274              | 25       | 72722          | 25          | 1212         | 25       | 20       |
| 26   | 0.4537856              | 86              | 1.5009832 | 146        | 2.5481807              | 26       | 75631          | 26          | 1261         | 26       | 21       |
| 27   | 0.4712389              | 87              | 1.5184364 | 147        | 2.5656339              | 27       | 78540          | 27          | 1309         | 27       | 22       |
| 28   | 0.4886922              | 88              | 1.5358897 | 148        | 2.5830872              | 28       | 81449          | 28          | 1357         | 28       | 23       |
| 29   | 0.5061455              | 89              | 1.5533430 | 149        | 2.6005405              | 29       | 84358          | 29          | 1406         | 29       | 23       |
| 30   | 0.5235988              | 90              | 1.5707963 | 150        | ,2.6179938             | 30       | 87266          | 30          | 1454         | 30       | 24       |
| 31   | 0.5410521              | 91              | 1.5882496 | 151        | 2.6354471              | 31       | 00155          |             | 1.500        |          |          |
| 32   | 0.5585054              | 92              | 1.6057029 | 151<br>152 | 2.6529004              | 32       | 90175          | 31          | 1503         | 31       | 25       |
| 33   | 0.5759587              | 93              | 1.6231562 | 153        | 2.6703537              | 33       | 93084          | 32          | 1551         | 32       | 26       |
| 34   | 0.5934119              | 94              | 1.6406095 | 154        | 2.6878070              | 34       | 95993<br>98902 | 33          | 1599         | 33       | 27       |
| 35   | 0.6108652              | 95              | 1.6580628 | 155        | 2.7052603              | 35       | 101811         | - 34        | 1648         | 34       | 27       |
| 36   | 0.6283185              | 96              | 1.6755161 | 156        | 2.7227136              | 36       | 104720         | 35<br>36    | 1697         | 35       | 28       |
| 37   | 0.6457718              | 97              | 1.6929693 | 157        | 2.7401668              | 37       | 107629         | 37          | 1745<br>1794 | 36       | 29       |
| 38   | 0.6632251              | 98              | 1.7104226 | 158        | 2.7576201              | 38       | 110538         | 38          | 1842         | 37       | 30       |
| 39   | 0.6806784              | 99              | 1.7278759 | 159        | 2.7750734              | 39       | 113446         | 39          | 1891         | 38<br>39 | 31<br>32 |
| 40   | 0.6981317              | 100             | 1.7459292 | 160        | 2.7925267              | 40       | 116355         | 40          | 1939         | 40       |          |
|      |                        |                 |           |            |                        |          |                |             | 1939         | -10      | 32       |
| 41   | 0.7155850              | 101             | 1.7627825 | 161        | 2.8099800              | 41       | 119264         | 41          | 1988         | 41       | 33       |
| 42   | 0.7330383              | 102             | 1.7802358 | 162        | 2.8274333              | 42       | 122173         | 42          | 2036         | 42       | 34       |
| 43   | 0.7504916              | 103             | 1.7976891 | 163        | 2.8448866              | 43       | 125082         | 43          | 2085         | 49       | 35       |
| 44   | 0.7679449              | 104             | 1.8151424 | 164        | 2.8623399              | 44       | 127991         | 44          | 2133         | 44       | 36       |
| 45   | 0.7853982              | 105             | 1.8325957 | 165        | 2.8797932              | 45       | 130900         | 45          | 2182         | 45       | 36       |
| 46   | 0.8028515              | 106             | 1.8500490 | 166        | 2.8972465              | 46       | 133809         | 46          | 2230         | 46       | 37       |
| 47   | 0.8203047              | 107             | 1.8675022 | 167        | 2.9146997              | 47       | 136717         | 47          | 2279         | 47       | 38       |
| 48   | 0.8377580              | 108             | 1.8849555 | 168        | 2.9321530              | 48       | 139626         | 48          | 2327         | 48       | 39       |
| 50   | 0.8552113              | 109             | 1.9024088 | 169        | 2.9496063              | 49       | 142585         | 49          | 2376         | 49       | 40       |
| 50   | 0.8726646              | 110             | 1.9198621 | 170        | 2.9670596              | 50       | 145444         | <i>5</i> 0  | 2424         | 50       | 40       |
| 51   | 0.8901179              | 111             | 1.9373154 | 171        | 2.9845129              | 51       | 148353         | 51          | 2473         | 51       | 41       |
| 52   | 0.9075712              | 112             | 1.9547687 | 172        | 3.0019662              | 52       | 151262         | 52          | 2521         | 52       | 42       |
| 53   | 0.9250245              | 113             | 1.9722220 | 173        | 3.0194195              | 53       | 154171         | 53          | 2570         | 53       | 43       |
| 54   | 0.9424778              | 114             | 1.9896753 | 174        | 3.0368728              | 54       | 157080         | 54          | 2618         | 54       | 44       |
| 55   | 0.9599311              | 115             | 2.0071286 | 175        | 3.0543261              | 55       | 159989         | 55          | 2666         | 55       | 44       |
| 56   | 0.9773844              | 116             | 2.0245819 | 176        | 3.0717794              | 56       | 162897         | 56          | 2715         | 56       | 45       |
| 57   | 0.9948377              | 117             | 2.0420352 | 177        | 3.0892327              | 57       | 165806         | 57          | 2763         | 57       | 46       |
| 58   | 1.0122910              | 118             | 2.0594885 | 178        | 3.1066860              | 58       | 168715         | 58          | 2812         | 58       | 47       |
| 59   | 1.0297443              | 119             | 2.0769418 | 179        | 3.1241393              | 59       | 171624         | 59          | 2860         | 59       | 48       |
| 60   | 1.0471976              | 120             | 2.0943950 | 180        | 3.1415926              | 60       | 174533         | 60          | 2909         | 60       | 48       |
|      |                        |                 |           |            |                        | :-       |                | <del></del> |              |          |          |
| J'   |                        | -               |           | _          |                        |          |                |             |              | -        | _        |

# TABLE LVII. RECIPROCALS OF NUMBERS.

| Num        | Reciproc. | Num      | Reciproc.              | Num        | Reciproc.              | Num.       | Reciproc.                       | Num        | Reciproc.              |
|------------|-----------|----------|------------------------|------------|------------------------|------------|---------------------------------|------------|------------------------|
| 1          | 1.0       | 61       | 0.0163934              | 121        | 0.0082645              | 181        | 0.0055249                       | 241        | 0.0041494              |
| 2          | 0.5       | 62       | 0.0161290              | 122        | 0.0081967              | 182        | 0.0054945                       | 242        | 0.0041322              |
| 3          | 0.3333333 | 63       | 0.0158730              | 123        | 0.0081300              | 183        | 0.0054645                       | 243        | 0.0041152              |
| 4          | 0.25      | 64       | 0.015625               | 124        | 0.0080645              | 184        | 0.0054348                       | 244        | 0.0040984              |
| 5          | 0.2       | 65       | 0.0153846              | 125        | 0.008                  | 185        | 0.0054054                       | 245        | 0.0040816              |
| 6          | 0.1666666 | 66       | 0.0151515              | 126        | 0.0079365              | 186        | 0.0053763                       | 246        | 0.004065               |
| 7          | 0.1428571 | 67       | 0.0149254              | 127        | 0.0078740              | 187        | 0.0053476                       | 247        | 0.0040486              |
| 8          | 0.125     | 68       | 0.0147059              | 128        | 0.0078125              | 188        | 0.0053191                       | 248        | 0.0040325              |
| 9          | 0.1111111 | 69       | 0.0144928              | 129        | 0.0077519              | 189        | 0.0052910                       | 249        | 0.0040161              |
| 10         | 0.1       | 70       | 0.0142857              | 130        | 0.0076923              | 190        | 0.0052632                       | 250        | 0.004 .                |
| 11         | 0.0909090 | 71       | 0.0140845              | 131        | 0.0076336              | 191        | 0.0052356                       | 251        | 0.0039841              |
| 12         | 0.0833333 | 72       | 0.0138888              | 132        | 0.0075757              | 192        | 0.0052083                       | 252        | 0.0039683              |
| 13         | 0.0769230 | 73       | 0.0136986              | 133        | 0.0075188              | 193        | 0.0051813                       | 253        | 0.0039526              |
| 14         | 0.0714285 | 74       | 0.0135135              | 134        | 0.0074627              | 194        | 0.0051546                       | 254        | 0.0039370              |
| 15         | 0.0666666 | 75<br>76 | 0.0133333              | 135<br>136 | 0.0074074              | 195        | 0.0051282                       | 255        | 0.0039216              |
| 16         |           | 77       | 0.0131579              | 136        | 0.0073529              | 196<br>197 | 0.0051020                       | 256<br>257 | 0.0039063              |
| 17         | 0.0588235 | 78       | 0.0128205              | 138        | 0.0072983              | 198        | 0.0050761                       | 258        | 0.0038760              |
| 18<br>19   | 0.0526316 | 79       | 0.0126582              | 139        | 0.0071942              | 199        | 0.0050303                       | 259        | 0.0038610              |
| . 20       | 0.05      | 80       | 0.0125                 | 140        | 0.0071429              | 200        | 0.005                           | 260        | 0.0038462              |
|            |           |          |                        |            |                        |            |                                 |            |                        |
| 21         | 0.0176190 | 81       | 0.0123457              | 141<br>142 | 0.0070922              | 201        | 0.0049751                       | 261        | 0.0038314              |
| 22         | 0.0454545 | 82<br>83 | 0.0121950<br>0.0120482 | 143        | 0.0070423              | 202        | 0.0049504                       | 262        | 0.0038168<br>0.0038023 |
| 23         | 0.0416666 | 84       | 0.0120482              | 144        | 0.0069444              | 203        | 0.0049261                       | 263<br>264 | 0.0037878              |
| 24<br>25   | 0.04      | 85       | 0.0119047              | 145        | 0.0068966              | 205        | 0.0049020<br>0.00487 <i>5</i> 0 | 265        | 0.0037736              |
| 26         | 0 0384615 | 86       | 0.0116279              | 146        | 0.0068498              | 206        | 0.0048730                       | 266        | 0.0037594              |
| 27         | 0.0370370 | 87       | 0.0114943              | 147        | 0.0068027              | 207        | 0.0048309                       | 267        | 0.0037453              |
| 28         | 0.0357143 | 88       | 0.0113636              | 148        | 0.0067567              | 208        | 0.0048077                       | 268        | 0.0037313              |
| 29         | 0.0344828 | 89       | 0.0112360              | 149        | 0.0067114              | 209        | 0.0047847                       | 269        | 0.0037175              |
| 30         | 0.0333333 | 90       | 0.0111111              | 150        | 0.0066666              | 210        | 0.0947619                       | 270        | 0.0037087              |
| 31         | 0.0322581 | 91       | 0.0109890              | 151        | 0.0066225              | 211        | 0.0047393                       | 271        | 0.0036900              |
| 32         | 0.03125   | 92       | 0.0108696              | 152        | 0.0065789              | 212        | 0.0047170                       | 272        | 0.0036765              |
| 33         | 0.0303030 | 93       | 0.0107527              | 153        | 0.0065359              | 213        | 0.0046948                       | 273        | 0.0066630              |
| 34         | 0.0294118 | 94       | 0.0106383              | 154        | 0.0064935              | 214        | 0.0046729                       | 274        | 0.0036496              |
| 3 <b>5</b> | 0.0285714 | 95.      | 0.0105263              | 155        | 0.0064516              | 215        | 0.0046512                       | 275        | 0.0036363              |
| 36         | 0.0277777 | 96       | 0.0104166              | 156        | 0.0064103              | 216        | 0.0046296                       | 276        | 0.0036232              |
| 87         | 0.0270270 | 97       | 0.0103093              | 157        | 0.0063694              | 217        | 0.0046083                       | 277        | 0.0036101              |
| 38         | 0.0263158 | 98       | 0.0102041              | 158        | 0.0063291              | 218        | 0.0045872                       | 278        | 0.0035971              |
| 39         | 0.0256410 | 99       | 0.0101010              | 159        | 0.0062893              | 219        | 0.0045662                       | 279        | 0.0035842              |
| 40         | 0.025     | 100      | 0.01                   | 160        | 0.00625                | 220        | 0.0045454                       | 280        | 0.0035714              |
| 41         | 0.0243902 | 101      | 0.0099009              | 161        | 0.0062112              | 221        | 0.0045249                       | 281        | 0.0035587              |
| 49<br>43   | 0.0238095 | 102      | 0.0098039              | 162<br>163 | 0.0061728<br>0.0061350 | 222        | 0.0045045<br>0.0044843          | 282<br>283 | 0.0035461<br>0.0035336 |
| 43<br>44   | 0.0232558 | 103      | 0.0097087              | . 164      | 0.0060975              | 223        |                                 | 283        | 0.0035336              |
| 45         | 0.0227272 | 104      | 0.0095238              | 165        | 0.0060675              | 225        | 0.0044643                       | 285        | 0.0035088              |
| 46         | 0.0222222 | 106      | 0.0094840              | 166        | 0.0060241              | 226        | 0.0044248                       | 286        | 0.0034965              |
| 47         | 0.0217391 | 107      | 0.0093458              | 167        | 0.0059880              | 227        | 0.0044053                       | 287        | 0.0034843              |
| 48         | 0.0208333 | 108      | 0.0092592              | 168        | 0.0059524              | 228        | 0.0043860                       | 288        | 0.0034722              |
| 49         | 0.0204082 | 109      | 0.0091748              | 169        | 0.0059172              | 229        | 0.0043668                       | 289        | 0.0034602              |
| 50         | 0.02      | 110      | 0.0090909              | 170        | 0.0058824              | 230        | 0.0043478                       | 290        | 0.0034483              |
| 51         | 0.0196078 | 111      | 0.0090090              | 171        | 0.0058480              | 231        | 0.0043290                       | 291        | 0.0034364              |
| 52         | 0.0192308 | 112      | 0.0089286              | 172        | 0.0058140              | 232        | 0.0043103                       | 292        | 0.0034246              |
| 53         | 0.0188679 | 113      | 0.0088496              | 173        | 0.0057803              | 233        | 0.0042918                       | 293        | 0.0034130              |
| 54         | 0.0185185 | 114      | 0.0087719              | 174        | 0.CO57471              | 234        | 0.0042735                       | 294        | 0.0034014              |
| 55         | 0.0181818 | 115      | 0.0086957              | 175        | 0.0057143              | 235        | 0.0042553                       | 295        | 0.0033898              |
| 56         | 0.0178571 | 116      | 0.0086207              | 176        | 0.0056818              | 286        | 0.0042373                       | 296        | 0.0033783              |
| 57         | 0.0175439 | 117      | 0.0085470              | 177        | 0.0056497              | 237        | 0.0042194                       | 297        | 0.0033670              |
| 58         | 0.0172414 | 118      | 0.0084745              | 178        | 0.0056180              | 238        | 0.0042017                       | 298        | 0.0033577              |
| 59         | 0.0169490 | 119      | 0.0084034              | 179        | 0.0055866              | 239        | 0.0041841                       | 299        | 0.0033445              |
| 60         | 0.0166666 | 120      | 0.0083333              | 180        | 0.0055555              | 240        | 0.0041666                       | 300        | 0.0033333              |
|            |           |          |                        |            |                        |            |                                 |            |                        |

TABLE LVII.
RECIPROCALS OF NUMBERS.

| Num. | Reciproc.   | Num. | Reciproc. | Num.  | Reciproc. | Num.   | Reciproc. | Num.        | Reciproc. |
|------|-------------|------|-----------|-------|-----------|--------|-----------|-------------|-----------|
| ·    |             |      |           |       |           | 103    |           | :-          | 0.0019494 |
| 301  | 0.0033223   | 361  | 0.0027701 | 421   | 0.0023753 | 481    | 0.0020790 | 541         | 0.0018484 |
| 309  | 0.0033113   | 362  | 0.0027624 | 422   | 0.0023697 | 482    | 0.0020747 | 542         | 0.0018450 |
| 303  | 0.0033003   | 363  | 0.0027548 | 423   | 0.0023641 | 483    | 0.0020704 | 543         | 0.0018416 |
| 304  | 0.0032895   | 364  | 0.0027473 | 424   | 0.0023585 | 484    | 0.0020661 | 544         | 0.0018382 |
| 305  | 0.0032787   | 365  | 0.0027397 | 425   | 0.0023529 | 485    | 0.0020619 | 545         | 0.0018349 |
| 306  | 0.0032680   | 366  | 0.0027322 | 426   | 0.0023474 | 486    | 0.0020576 | 546         | 0.0018315 |
| 307  | 0.0032573   | 367  | 0.0027248 | 427   | 0.0023419 | 487    | 0.0020534 | 547         | 0.0018282 |
| 308  | 0.0032468   | 368  |           | 428   |           | 488    | 0.0020492 | 548         | 0.0018248 |
|      |             |      | 0.0027174 |       | 0.0023364 | • 1    |           | 549         | 0.0018215 |
| 309  | 0.0032362   | 369  | 0.0027100 | 429   | 0.0023310 | 489    | 0.0020450 |             |           |
| 310  | 0.0032258   | 370  | 0.0027027 | 430   | 0.0023256 | 490    | 0.0020408 | 550         | 0.0018181 |
| 311  | 0.0032154   | 371  | 0.0000054 | 431   | 0.0000000 | 491    | 0.0020367 | 551         | 0.0018149 |
|      |             |      | 0.0026954 |       | 0.0023202 |        |           |             |           |
| 312  | 0.0032051   | 372  | 0.0026882 | 432   | 0.0023148 | 492    | 0.0020325 | 552         | 0.0018116 |
| 313  | 0.0031949   | 373  | 0.0026810 | 433   | 0.0023095 | 493    | 0.0020284 | <b>5</b> 53 | 0.0018083 |
| 314  | 0.0031847   | 374  | 0.0026738 | 434   | 0.0023042 | 494    | 0.0020243 | 554         | 0.0018051 |
| 315  | 0.0031746   | 375  | 0.0026666 | 435   | 0.0022989 | 495    | 0.0020202 | 555         | 0.0018018 |
| 316  | 0.0031646   | 376  | 0.0026596 | 436   | 0.0022936 | 496    | 0.0020162 | 556         | 0.0017986 |
| 317  | 0.0031546   | 377  | 0.0026525 | 437   | 0.0022883 | 497    | 0.0020121 | 557         | 0.0017953 |
| 318  | 0.0031447   | 378  | 0.0026455 | 438   | 0.0022831 | 498    | 0.0020080 | 558         | 0.0017921 |
| 319  |             |      |           |       |           | 499    |           | 559         | 0.0017889 |
|      | 0.0031348   | 379  | 0.0026385 | 439   | 0.0022779 | ! !    | 0.0020040 |             |           |
| 320  | 0.003125    | 380  | 0.0026316 | 440   | 0.0022727 | 500    | 0.002     | ช60         | 0.0017857 |
| 321  | 0.0031153   | 381  | 0.0000047 | 441   | 0.0022676 | 501    | 0.0019960 | 561         | 0.0017825 |
|      |             |      | 0.0026247 |       |           |        |           |             |           |
| 322  | 0.0031056   | 382  | 0.0026178 | 442   | 0.0022624 | 502    | 0.0019920 | 562         | 0.0017794 |
| 323  | 0.0030960   | 388  | 0.0026110 | 443   | 0.0022573 | 503    | 0.0019881 | 563         | 0.0017762 |
| 324  | 0.0030864   | 384  | 0.0026042 | 444   | 0.0022522 | 504    | 0.0019841 | 56+         | 0.0017730 |
| 325  | 0.0030769   | 385  | 0.0025974 | 445   | 0.0022472 | 505    | 0.0019801 | 565         | 0.0017699 |
| 326  | 0.0030675   | 386  | 0.0025907 | 446   | 0.0022422 | 506    | 0.0019763 | 566         | 0.0017668 |
| 327  | 0.0030581   | 387  | 0 0025840 | 447   | 0.0022371 | 507    | 0.0019724 | 567         | 0.0017637 |
| 328  | 0.0030488   | 388  | 0.0025773 | 448   | 0.0022321 | 508    | 0.0019685 | 568         | 0.0017606 |
| .329 |             |      |           | 449   |           | 509    |           | 569         |           |
|      | 0.0030395   | 389  | 0.0025707 |       | 0.0022272 |        | 0.0019646 |             | 0.0017575 |
| 330  | 0.0030303   | 390  | 0.0025641 | 450   | 0.0022222 | 510    | 0.0019608 | 570         | 0.0017544 |
| 331  | 0.0030211   | 391  | 0.0005575 | 451   | 0.0022173 | 511    | 0.0019569 | 571         | 0.0017513 |
|      |             |      | 0.0025575 |       |           |        |           | 572         |           |
| 332  | 0.0030120   | 392  | 0.0025510 | 452   | 0.0022124 | 512    | 0.0019531 |             | 0.0017483 |
| 333  | 0.0030030   | 393  | 0.0025445 | 453   | 0.0022075 | 513    | 0.0019493 | 573         | 0.0017452 |
| 334  | . 0.0029940 | 394  | 0.0025381 | 454   | 0.0022026 | 514    | 0.0019455 | 574         | 0.0017422 |
| 335  | 0.0029851   | 395  | 0.0025316 | 455   | 0.0021978 | 515    | 0.0019417 | 575         | 0.0017391 |
| 386  | 0.0029762   | 396  | 0.0025252 | 456   | 0.0021930 | 516    | 0.0019380 | 576         | 0.0017361 |
| 337  | 0.0029674   | 397  | 0.0025189 | 457   | 0.0021882 | 517    | 0.0019342 | 577         | 0.0017331 |
| 338  | 0.0029586   | 398  | 0.0025126 | 458   | 0.0021834 | 1:     | 0.0019305 | 578         | 0.0017301 |
| 339  | 0.0029499   | 399  | 0.0025063 | 459   | 0.0021786 | 519    | 0.0019268 | 579         | 0.0017271 |
|      |             |      |           |       | 1         |        |           |             |           |
| 340  | 0.0029412   | 400  | 0.0025    | 460   | 0.0021739 | 520    | 0.0019231 | 580         | 0.0017241 |
| 341  | 0.0029326   | 401  | 0.0024938 | 461   | 0.0021692 | 521    | 0.0019194 | 581         | 0.0017212 |
|      | 0.0029320   | 402  |           | 462   |           | 522    | 0.0019194 | 582         | 0.0017212 |
| 342  |             |      | 0.0024876 |       | 0.0021645 |        |           |             |           |
| 343  | 0.0029155   | 403  | 0.0024814 | 463   | 0.0021598 | 523    | 0.0019120 | 583         | 0.0017153 |
| 344  | 0.0029070   | 404  | 0.0024752 | 464   | 0.0021552 | 524    | 0.0019084 | 584         | 0.0017123 |
| 345  | 0.0028986   | 405  | 0.0024691 | 465   | 0.0021505 | 525    | 0.0019048 | 585         | 0.0017094 |
| 346  | 0.0028902   | 406  | 0.0024631 | 466   | 0.0021459 | 526    | 0.0019011 | 586         | 0.0017065 |
| 347  | 0.0028818   | 407  | 0.0024570 | 467   | 0.0021413 | 527    | 0.0018975 | 587         | 0.0017036 |
| 348  | 0.0028736   | 408  | 0.0024510 | 468   | 0.0021368 | 528    | 0.0018939 | 588         | 0.0017007 |
| 349  | 0.0028653   | 409  | 0.0024510 | 469   | 0.0021303 | 529    | 0.0018904 | 589         | 0.0016978 |
|      |             |      |           |       |           |        |           |             |           |
| 350  | 0.0028571   | 410  | 0.0024390 | 470   | 0.0021277 | 530    | 0.0018868 | 590         | 0.0016949 |
| 351  | 0.0028490   | 411  | 0.0024331 | 471   | 0.0021231 | 531    | 0.0018832 | 591         | 0.0016920 |
|      | 0.0028409   | 412  | 0.0024331 | 472   | 0.0021231 | 532    | 0.0018332 | 592         | 0.0016891 |
| 352  |             |      |           |       |           |        |           |             |           |
| 353  | 0.0028329   | 413  | 0.0024213 | 473   | 0.0021142 | 533    | 0.0018762 | 593         | 0.0016863 |
| 354  | 0.0028248   | 414  | 0.0024155 | 474   | 0.0021097 | 534    | 0.0018727 | 594         | 0.0016835 |
| 355  | 0.0028169   | 415  | 0.0024096 | 475   | 0.0021053 | 535    | 0.0018692 | 595         | 0.0016807 |
| 356  | 0.0028090   | 416  | 0.0024038 | 476   | 0.0021008 | 536    | 0.0018657 | 596         | 0.0016779 |
| 357  | 0.0028011   | 417  | 0.0023981 | 477   | 0.0020964 | 537    | 0.0018622 | 597         | 0.0016750 |
| 358  | 0.0027933   | 418  | 0.0023923 | 478   | 0.0020921 | 538    | 0.0018587 | 598         | 0.0016722 |
| 359  | 0.0027855   | 419  | 0.0023866 | 479   | 0.0020877 | 539    | 0.0018553 | 599         | 0.0016694 |
| 360  | 0.0027777   | 420  | 0.0023810 | 480   | 0.0020833 | 540    | 0.0018518 | 600         | 0.0016666 |
| 300  |             | 20   | 0.0020010 | 1 200 | 3.00000   | , 5 40 | 3.55.55.6 | 1 300 [     | 3.001000  |
|      |             |      |           |       |           |        |           |             |           |

# TABLE LVII. RECIPROCALS OF NUMBERS.

| Num. | Reciproc. | Num. | Reciproc.              | Num.       | Reciproc.                      | Num-               | Reciproc.              | Num         | Reciproc.              |
|------|-----------|------|------------------------|------------|--------------------------------|--------------------|------------------------|-------------|------------------------|
| 601  | 0.0016639 | 661  | 0.0015129              | 721        |                                | <del> </del>       |                        | [ <u></u> - |                        |
| 602  | 0.0016611 | 662  | 0.0015129              | 722        | 0.0013870                      | 781                | 0.0012804              | 841         | 0.0011891              |
| 603  | 0.0016584 | 663  | 0.0015083              | 723        | 0.0013850                      | 782                | 0.0012788              | 842         | 0.0011876              |
| 604  | 0.0016556 | 664  | 0.0015060              | 724        | 0.0013831                      | 783<br>784         | 0.0012771              | 843         | 0.0011862              |
| 605  | 0.0016529 | 665  | 0 0015038              | 725        | 0.0013793                      | 785                | 0.0012755<br>0.0012739 | 844<br>845  | 0.0011848              |
| 606  | 0.0016501 | 666  | .0.0015015             | 726        | 0.0013774                      | 786                | 0.0012739              | 846         | 0.0011834              |
| 607  | 0.0016474 | 667  | 0.0014993              | 727        | 0.0013755                      | 787                | 0.0012726              | 847         | 0.0011820              |
| 608  | 0.0016447 | 668  | 0.0014970              | 728        | 0.0013736                      | 788                | 0.0012690              | 848         | 0.0011792              |
| 609  | 0.0016420 | 669  | 0.0014948              | 729        | 0.0013717                      | 789                | 0.0012674              | 849         | 0.0011779              |
| 610  | 0.0016393 | 670  | 0.0014925              | 730        | 0.0013699                      | 790                | 0.0012658              | 850         | 0.0011765              |
| 611  | 0.0016367 | 671  | 0.0014903              | 731        | 0.0010000                      |                    |                        |             |                        |
| 612  | 0.0016340 | 672  | 0.0014903              | 732        | 0.0013680<br>0.0013661         | 791                | 0.0012642              | 851         | 0.0011751              |
| 613  | 0.0016313 | 673  | 0.0014859              | 733        | 0.0013643                      | 792                | 0.0012626              | 852         | 0.0011737              |
| 614  | 0.0016287 | 674  | 0.0014837              | 734        | 0.0013624                      | 793<br>794         | 0.0012610              | 853<br>854  | 0.0011723              |
| 615  | 0.0016260 | 675  | 0.0014814              | 735        | 0.0013605                      | 795                | 0.0012594              | 855         | 0.0011710              |
| 616  | 0.0016234 | 676  | 0.0014793              | 736        | 0.0013587                      | 796                |                        | 856         | 0.0011696              |
| 617  | 0.0016207 | 677  | 0.0014771              | 737        | 0.0013569                      | 797                | 0.0012563<br>0.0012547 | 857         | 0.0011682<br>0.0011669 |
| 618  | 0.0016181 | 678  | 0.0014749              | 738        | 0.0013550                      | 798                | 0.0012531              | 858         | 0.0011655              |
| 619  | 0.0016155 | 679  | 0.0014728              | 739        | 0.0013532                      | 799                | 0.0012516              | 859         | 0.0011633              |
| 620  | 0.0016129 | 680  | 0.0014706              | 740        | 0.0013513                      | 800                | 0.00125                | 860         | 0.0011628              |
| 621  | 0.0016103 | 681  |                        |            |                                |                    |                        |             |                        |
| 622  | 0.0016077 | 682  | 0.0014684              | 741        | 0.0013495                      | 801                | 0.0012484              | 861         | 0.0011614              |
| 623  | 0.0016051 | 683  | 0.0014663<br>0.0014641 | 742<br>743 | 0.0013477                      | 802                | 0.0012469              | 862         | 0.0011601              |
| 624  | 0.0016026 | 684  | 0.0014641              | 744        | 0.0013459                      | 803                | 0.0012453              | 863         | 0.0011587              |
| 625  | 0.0016    | 685  | 0.0014599              | 745        | 0.0013441                      | 804                | 0.0012438              | 864         | 0.0011574              |
| 626  | 0.0015974 | 686  | 0.0014577              | 746        | 0.0013423<br>0.0013405         | 80 <i>5</i><br>806 | 0.0012422              | 865         | 0.0011561              |
| 627  | 0.0015949 | 687  | 0.0014556              | 747        | 0.0013387                      | 807                | 0.0012407              | 866<br>867  | 0.0011547              |
| 628  | 0.0015924 | 688  | 0.0014535              | 748        | 0.0013369                      | 808                | 0.0012392<br>0.0012376 | 868         | 0.0011534              |
| 629  | 0.0015898 | 689  | 0.0014514              | 749        | 0.0013351                      | 809                | 0.0012376              | 869         | 0.0011507              |
| 630  | 0.0015873 | 690  | 0.0014493,             | 750        | 0.0013333                      | 810                | 0.0012346              | 870         | 0.0011307              |
| 631  | 0.0015848 | 691  | 0.0014470              |            |                                |                    |                        | <u> </u>    |                        |
| 632  | 0.0015823 | 692  | 0.0014472              | 751        | 0.0018316                      | 811                | 0.0012330              | 871         | 0.0011481              |
| 633  | 0.0015798 | 693  | 0.0014451<br>0.0014430 | 752        | 0.0013298                      | 812                | 0.0012315              | 872         | 0.0011468              |
| 634  | 0.0015773 | 694  | 0.0014430              | 753<br>754 | 0.0013280                      | 813                | 0.0012300              | 873         | 0.0011455              |
| 635  | 0.0015748 | 695  | 0.0014388              | 755        | 0.0013263<br>0.0013245         | 814                | 0.0012285              | 874         | 0.0011442              |
| 636  | 0.0015723 | 696  | 0.0014368              | 756        | 0.0013243                      | 815                | 0.0012270              | 875         | 0.0011429              |
| 637  | 0.0015699 | 697  | 0.0014347              | 757        | 0.0013220                      | 816<br>817         | 0.0012255              | 876<br>877  | 0.0011416              |
| 638  | 0.0015674 | 698  | 0.0014327              | 758        | 0.0013193                      | 818                | 0.0012240<br>0.0012225 | 878         | 0.0011403              |
| 639  | 0.0015649 | 699  | 0.0014306              | 759        | 0.0013175                      | 819                | 0.0012223              | 879         | 0.0011390              |
| 640  | 0.0015625 | 700  | 0.0014286              | 760        | 0.0013158                      | 820                | 0.001210               | 880         | 0.0011363              |
| 641  | 0.0015601 | 70:  |                        |            |                                | <b> </b>           |                        |             | 0.0011303              |
| 642  | 0.0015576 | 701  | 0.0014265              | 761        | 0.0013141                      | 821                | 0.0012180              | 881         | 0.0011351              |
| 643  | 0.0015552 | 702  | 0.0014245              | 762        | 0.0013123                      | 822                | 0.0012165              | 882         | 0.0011338              |
| 644  | 0.0015528 | 704  | 0.0014225              | 763        | 0.0013106                      | 823                | 0.0012151              | 883         | 0.0011325              |
| 645  | 0.0015504 | 705  | 0.0014205              | 764<br>765 | 0.0013089                      | 824                | 0.0012136              | 884         | 0.0011312              |
| 646  | 0.0015480 | 706  | 0.0014164              | 766        | 0.0013072<br>0.00130 <i>55</i> | 825                | 0.0012121              | 885         | 0.0011299              |
| 647  | 0.0015456 | 707  | 0.0014144              | 767        | 0.0013038                      | 826<br>827         | 0.0012106              | 886         | 0.0011287              |
| 648  | 0.0015432 | 708  | 0.0014124              | 768        | 0.0013038                      | 827                | 0.0012092              | 887         | 0.0011274              |
| 649  | 0.0015408 | 709  | 0.0014104              | 769        | 0.0013004                      | 829                | 0.0012077<br>0.0012063 | 888         | 0.0011261              |
| 650  | 0.0015385 | 710  | 0.0014085              | 770        | 0.0012987                      | 830                | 0.0012063              | 889<br>890  | 0.0011249<br>0.0011236 |
| 651  | 0.0015361 | 711  | <u> </u>               | ļ          |                                |                    |                        |             | 0.0011230              |
| 652  | 0.0015337 | 711  | 0.0014065              | 771        | 0.0012970                      | 831                | 0.0012034              | 891         | 0.0011223              |
| 653  | 0.0015314 | 713  | 0.0014045              | 772        | 0.0012953                      | 832                | 0.0012019              | 892         | 0.0011211              |
| 654  | 0.0015291 | 714  | 0.0014025              | 773        | 0.0012937                      | 833                | 0.0012005              | 893         | 0.0011198              |
| 655  | 0.0015267 | 715  | 0.0013986              | 774        | 0.0012920                      | .834               | 0.0011990              | 894         | 0.0011186              |
| 656  | 0.0015244 | 716  | 0.0013966              | 776        | 0.0012903                      | 835                | 0.0011976              | 895         | 0.0011173              |
| 657  | 0.0015221 | 717  | 0.0013947              | 777        | 0.0012870                      | 836<br>837         | 0.0011962              | 896         | 0.0011161              |
| 658  | 0.0015198 | 718  | 0.0013928              | 778        | 0.0012870                      | 838                | 0.0011947<br>0.0011933 | 897         | 0.0011148              |
| 659  | 0.0015175 | 719  | 0.0013908              | 779        | 0.0012837                      | 839                | 0.0011933              | 898<br>899  | 0.0011136              |
| 660  | 0.0015151 | 720  | 0.0013888              | 780        |                                |                    |                        | 900         | 0.0011123              |
| 1    |           |      |                        |            |                                |                    | 3.0017303              | , 500       | 0.0011111              |
|      |           |      |                        | <u> </u>   |                                |                    |                        |             |                        |

TABLE LVII.
RECIPROCALS OF NUMBERS.

| Num. | Reciproc. | Num. | Reciproc.   | Num. | Reciproc. | Num. | Reciproc. | Num. | Reciproc. |
|------|-----------|------|-------------|------|-----------|------|-----------|------|-----------|
| 901  | 0.0011099 | 921  | 0.0010858   | 941  | 0.0010627 | 961  | 0.0010406 | 981  | 0.0010194 |
| 902  | 0.0011086 | 922  | 0.0010846   | 942  | 0.0010616 | 962  | 0.0010395 | 982  | 0.0010183 |
| 903  | 0.0011074 | 923  | 0.0010834   | 943  | 0.0010604 | 963  | 0.0010384 | 983  | 0.0010173 |
| 904  | 0.0011062 | 924  | 0.0010823   | 944  | 0.0010593 | 964  | 0.0010373 | 984  | 0.0010163 |
| 905  | 0.0011050 | 925  | 0.0010810   | 945  | 0.0010582 | 965  | 0.0010868 | 985  | 0.0010152 |
| 906  | 0.0011038 | 926  | 0.0010799   | 946  | 0.0010571 | 966  | 0.0010352 | 986  | 0.0010142 |
| 907  | 0.0011025 | 927  | 0.0010787   | 947  | 0.0010560 | 967  | 0.0010341 | 987  | 0.0010132 |
| 908  | 0.0011013 | 928  | 0.0010776   | 948  | 0.0010549 | 968  | 0.0010381 | 988  | 0.0010121 |
| 909  | 0.0011001 | 929  | 0.0010764   | 949  | 0.0010537 | 969  | 0.0010320 | 989  | 0.0010111 |
| 910  | 0.0010989 | 930  | 0.0010753   | 950  | 0.0010526 | 970  | 0.0010309 | 990  | 0.0010101 |
| 911  | 0.0010977 | 981  | 0.0010741   | 951  | 0.0010515 | 971  | 0.0010299 | 991  | 0.0010091 |
| 912  | 0.0010965 | 932  | 0.0010730   | 952  | 0.0010504 | 972  | 0.0010288 | 992  | 0.0010081 |
| 913  | 0.0010958 | 933  | 0.0010718   | 953  | 0.0010493 | 973  | 0.0010277 | 998  | 0.0010070 |
| 914  | 0.0010941 | 994  | 0.0010707   | 954  | 0.0010482 | 974  | 0.0010267 | 994  | 0.0010060 |
| 915  | 0.0010929 | 935  | 0.0010695   | 955  | 0.0010471 | 975  | 0.0010256 | 995  | 0.0010050 |
| 916  | 0.0010917 | 936  | 0,0010684   | 956  | 0.0010460 | 976  | 0.0010246 | 996  | 0.0010040 |
| 917  | 0.0010905 | 937  | 0.0010672   | 957  | 0.0010449 | 977  | 0.0010235 | 997  | 0.0010030 |
| 918  | 0.0010893 | 938  | 0.0010661   | 958  | 0.0010438 | 978  | 0.0010225 | 998  | 0.0010020 |
| 919  | 0.0010881 | 939  | O · 0010650 | 959  | 0.0010428 | 979  | 0.0010215 | 999  | 0.0010010 |
| 920  | 0.0010870 | 940  | 0.0010638   | 960  | 0.0010416 | 980  | 0.0010204 | 1000 | 0.001     |
|      |           |      |             |      |           |      |           |      |           |

### TABLE LVIII.

## SQUARE ROOTS OF

### NUMBERS.

#### FROM 1 TO 1000.

| Num. | Square Root. | Num. | Square Root. | Num. | Square Root. | Num. | Square Root. | Num. | SquareRoot |
|------|--------------|------|--------------|------|--------------|------|--------------|------|------------|
| 1    | 1.0000000    | 21   | 4.5825757    | 41   | 6.4031242    | 61   | 7.8102497    | 81   | 9.0000000  |
| 2    | 1.4142136    | 22   | 4.6904158    | 42   | 6.4807407    | 62   | 7.8740079    | 82   | 9.0553851  |
| 8    | 1.7830508    | 23   | 4.7958315    | 43   | 6.5574385    | 63   | 7.9372539    | 83   | 9.1104336  |
| 4    | 2.0000000    | 24   | 4.8989795    | 44   | 6.6332496    | 64   | 8.0000000    | 84   | 9.1652514  |
| 5    | 2.2360680    | 25   | 5.0000000    | 45   | 6,7082039    | 65   | 8.0622577    | -85  | 9.2195445  |
| 6    | 2.4494897    | 26   | 5.0990195    | 46   | 6.7823300    | 66   | 8.1240384    | 86   | 9.2736185  |
| 7    | 2.6457513    | 27   | 5.1961524    | 47   | 6.8556546    | 67   | 8.1853528    | 87   | 9.3273791  |
| 8    | 2.8284271    | 28   | 5.2915026    | 48   | 6.9282032    | 68   | 8.2462113    | 88   | 9.3808315  |
| 9    | 8.0000000    | 29   | 5.3851648    | 49   | 7.0000000    | 69   | 8.3066239    | 89   | 9.4339811  |
| 10   | 3.1622777    | 30   | 5.4772256    | 50   | 7.0710678    | 70   | 8.3666003    | 90   | 9.4868330  |
| 11   | 3.3166258    | 31   | 5.5677644    | 51   | 7,1414284    | 71   | 8.4261498    | 91   | 9.5393920  |
| 12   | 3.4641016    | 82   | 5.6568542    | 52   | 7.2111026    | 72   | 8.4852814    | 92   | 9.5916630  |
| 13   | 8.6055513    | 38   | 5.7445626    | 53   | 7.2801099    | 73   | 8.5440037    | 93   | 9.6436508  |
| 14   | 3.7416574    | 94   | 5.8309519    | 54   | 7.3484692    | 74   | 8.6023253    | 94   | 9.6953597  |
| 15   | 3.8729833    | S5   | 5.9160798    | 55   | 7.4161985    | 75   | 8.6602540    | 95   | 9.7467948  |
| 16   | 4.0000000    | 36   | 6.0000000    | 56   | 7.4833148    | 76   | 8.7177979    | 96   | 9.7979590  |
| 17   | 4.1231056    | 97   | 6.0827625    | 57   | 7.5498944    | 77   | 8.7749644    | 97   | 9.8488578  |
| 18   | 4.2426407    | 38   | 6.1644140    | 58   | 7.6157731    | 78   | 8.8817609    | 98   | 9.8994949  |
| 19   | 4.3588989    | 39   | 6.2449980    | 59   | 7.6811457    | 79   | 8.8881944    | 99   | 9.9498744  |
| 20   | 4.4721360    | 40   | 6.3245559    | 60   | 7.7459667    | 80   | 8.9442719    | 100  | 10.0000000 |

# TABLE LVIII. SQUARE ROOTS OF NUMBERS.

| Num.       | Square Root.             | Num.       | Square Root              | Num        | Square Root              | Num        | Square Root.             | Num.       | Square Root.             |
|------------|--------------------------|------------|--------------------------|------------|--------------------------|------------|--------------------------|------------|--------------------------|
| 101        | 10.0498756               | 161        | 12.6885775               | 221        | 14.8660688               | 281        | 16.7630547               | 341        | 18.4661853               |
|            | 10.0995049               | 162        | 12.7279220               | 222        | 14.8996644               | 282        |                          | 342        | 18.4932421               |
| 103        | 10.1488916               | 163        | 12.7671453               | 223        | 14.9331845               | 283        | 16.8226038               | 343        | 18.5202591               |
| 104        | 10.1980390               | 164        | 12.8062485               | 224        | 14.9666295               | 284        | 16.8522995               | 344        | 18.5472370               |
| 105        | 10.2469508               | 165        | 12.8452326               | 225        | 15.0000000               | 285        | 16.8819430               | 345        | 18.5741757               |
| 106        | 10.2956301               | 166        | 12.8840987               | 226        | 15.0332963               | 286        | 16.9115345               | 346        | 18.6010752               |
| 107        | 10.3440804               | 167        | 12.9228480               | 227        | 15.0665191               | 287        | 16.9410743               | 347        | 18.6279361               |
| 108        | 10.3923048               | 168        | 12.9614814               | 228        | 15.0996689               | 288        | 16.9705628               | 348        | 18.6547581               |
| 109        | 10.4403065               | 169        | 13.0000000               | 229        | 15.1327460               | 289        | 17.0000000               | 349        | 18.6815417               |
| 110        | 10.4880885               | 170        | 13.0884048               | 230        | 15.1657509               | 290        | 17.0293863               | 350        | 18.7082870               |
| 111        | 10.5356538               | 171        | 13.0766968               | 231        | 15.1986841               | 291        | 17.0587221               | 351        | 18.7349940               |
| 112        | 10.5830052               | 172        | 13.1148770               | 232        | 15.2315462               | 292        | 17.0880074               | 352        | 18.7616631               |
| 113        | 10.6301458               |            | 13.1529464               |            | 15.2643375               | 293        | 17.1172428               | 353        | 18.7882942               |
| 114        | 10.6770782               | 174        | 13.1909060               |            | 15.2970585               | 294        | 17.1464281               | 354        | 18.8148878               |
| 115        | 10.7238053               | 175        | 13.2287566               | 235        | 15.3297098               | 295        | 17.1755640               | 355        | 18.8414437               |
| 116        | 10.7703296               | 176        | 13.2664992               | 236        | 15.3622914               | )          | 17.2046505               | 356        | 18.8679 <b>622</b>       |
| 117        | 10.8166538               | 177        | 13.3041347               | 237        | 15.3948043               | 297        | 17.2336880               | 357        | 18.8944437               |
| 118        | 10.8627805               | 178        | 13.3416641               | 238        | 15.4272487               | 298        | 17.2626765               | 358        | 18.9208880               |
| 119        | 10.9087121               | 179        | 13.3790882               | 239        | 15.4596249               | 299        | 17.2916164               | 359        | 18.9472953               |
| 120        | 10.9544512               | 180        | 13.4164079               | 240        | 15.4919383               | 300        | 17.3205080               | 360        | 18.9736660               |
| 121        | 11.0000000               | 181        | 13.4536240               | 241        | 15.5241747               | 301        | 17.3493515               | 361        | 19.0000000               |
| 122        | 11.0453610               | 182        | 13.4907376               | 242        | 15.5563491               | 302        | 17.3781471               | 362        | 19.0262976               |
|            | 11.0905365               | 183        | 13.5277493               | 243        | 15.5884572               | 303        | 17.4068951               | 363        | 19.0525589               |
| 124        | 11.1355287               | 184        | 13.5646600               |            | 15.6204993               | 304        | 17.4355958               |            | 19.0787841               |
| 125        | 11.1803399               | 185<br>186 | 13.6014705               |            | 15.6524759               | 305        | 17.4642491               | 365        | 19.1049731               |
| 126        | 11.2249722               | 187        | 13.6381817               |            | 15.6843871               | 306        | 17.4928557               | 366        | 19.1311264               |
| 127        | 11.2694277               | 188        | 13.6747943               |            | 15.7162337               | 307        | 17.5214154               | 367        | 19.1572441               |
| 128        | 11.3137085<br>11.3578167 | 189        | 13.7113092<br>13.7477271 | 248<br>249 | 15.7480158               | 308        | 17.5499288               | 368<br>369 | 19.1833261               |
| 129<br>130 | 11.4017543               | 190        | 13.7840488               | 250        | 15.7797339<br>15:8112882 | 309<br>310 | 17.5783959<br>17.6068169 | 370        | 19.2093728<br>19.2353841 |
| 130        | 11.4017545               |            | 13.7040466               | 230        | 13.6112602               | 310        | 17.0000109               | 310        | 19.2003041               |
| 131        | 11.4455231               | 191        | 13.8202750               | 251        | 15.8429795               | 311        | 17.6351921               | 371        | 19.2613602               |
| 132        | 11.4891253               | 192        | 13.8564065               | 252        | 15.8745079               | 312        | 17.6635218               | 372        | 19.2873016               |
| 133        | 11.5325626               | 193        | 13.8924440               | 253        | 15.9059738               | 313        | 17.6918061               | 373        | 19.3132080               |
|            | 11.5758369               |            | 13.9283883               |            | 15.9373774               | 314        | 17.7200451               | 374        | 19.3390538               |
| 135        | 11.6189500               | 195        | 13.9642400               | 255        | 15.9687194               | 315        | 17.7482393               | 375        | 19.3649168               |
| 136        | 11.6619038               | 196        | 14.0000000               | 256        | 16.0000000               | 316        | 17.7763889               | 376        | 19.3907194               |
| 137        | 11.7046999               | 197        | 14.0356688               | 257        | 16.0312195               | 317        | 17.8044939               | 377        | 19.4164879               |
| 138        | 11.7478444               | 198        | 14.0712473               | .258       | 16.0623784               | 318        | 17.8325546               | 378        | 19.4492221               |
| 139        | 11.7898261               | 199        | 14.1067360               | 259        | 16.0934770               | 319        | 17.8605711               | 379        | 19.4679223               |
| 140        | 11.8321596               | 200        | 14.1421356               | 260        | 16.1245154               | 320        | 17.8885439               | 380        | 19.4935887               |
| 141        | 11.8743421               | 201        | 14.1774469               | 261        | 16.1554944               | 321        | 17.9164729               | 381        | 19.5192212               |
|            | 11.9163753               | 202        | 14.2126704               | 262        | 16.1864140               | 322        | 17.9443584               | 382        | 19.5 <b>448202</b>       |
| 143        | 11.9582607               | 203        | 14.2478068               | 263        | 16.2172748               | 323        | 17.9722008               | 383        | 19.5703858               |
|            | 12.0000000               | 204        | 14.2828569               | 264        | 16.2480769               | 324        | 18.0000000               | 384        | 19.5959179               |
| 145        | 12.0415946               | 205        | 14.3178211               | 265        | 16.27\$8205              | 325        | 18.0277563               | 385        | 19.6214169               |
| 146        | 12.0830460               | 206        | 14.3527001               |            | 16.3095064               | 326        | 18.0554701               | 386        | 19.6468828               |
| 147        | 12.1249557               | 207<br>208 | 14.3874945               | 267        | 16.3401347               | 327        | 18.0831413               | 387        | 19.6723156               |
| 148        | 12.1655251               | 1          | 14.4222051               | 268        | 16.3707055               | 328        | 18.1107702               | 388        | 19.6977157               |
| 149        | 12.2065556               | 209<br>210 | 14.4568322               | 269        | 16.4012194               | 329        | 18.1383571               | 389        | 19.7230830               |
| 150        | 12.2474487               |            | 14.4913761               | 270        | 16.4316768               | 330        | 18.1659021               | 390        | 19.7484177               |
| 151        | 12.2882057               | 211        | 14.5258390               | 271        | 16.4620777               | 331        | 18.1934053               | 391        | 19.7737100               |
| 152        | 12.3288280               |            | 14.5602198               | 272        | 16.4924225               | 332        | 18.2208671               | 392        | 19.7989899               |
| 153        | 12.8693169               | 213        | 14.5945195               | 273        | 16.5227117               | 333        | 18.2482576               | 393        | 19.8242277               |
| 154        | 12.4096786               | 214        | 14.6287389               | 274        | 16.5529458               | 334        | 18.2756669               | 394        | 19.8494332               |
| 155        | 12.4498996               | 215<br>216 | 14.6628782               | 275<br>276 | 16.5831240               | 335        | 18.3030052               | 395        | 19.8746070               |
| 156        | 12.4899960               | N          | 14.6969384               | И          | 16.6132478               | 336        | 18.3303028               | 396        | 19.8997488               |
| 157<br>158 | 12.5299640<br>12.5698051 | 218        | 14.7309199<br>14.7648230 | 277<br>278 | 16.6433170<br>16.6733320 | 337<br>338 | 18.9575598               | 397        | 19.9245589               |
| 159        | 12.6095202               | 219        | 14.7986485               | 279        | 16 7032930               | 339        | 18.3847763<br>18.4119527 | 398<br>399 | 19.9499373               |
|            | 12.6491106               |            | 14.8323970               |            | 16.7332005               |            | 18.4390890               |            | 19.9749843<br>20.0000000 |
|            | ,                        | ., _20     | - 1.0020010              | , 200      | 1. 0 . 11.72000          | 0.00       | 10.1030000               |            | 120.000000               |
|            |                          |            |                          |            |                          |            |                          |            | į.                       |

## TABLE LVIII.

## SQUARE ROOTS OF NUMBERS.

|     | 10           |                  | 1      |              |             |                     |              | · · · · · · · · · · · · · · · · · · · |
|-----|--------------|------------------|--------|--------------|-------------|---------------------|--------------|---------------------------------------|
| Num | Square Root  | Num. Square Root | . Num  | Square Root. | Num.        | Square Root.        | Num.         | Square Root                           |
| 40i |              |                  |        |              | <u> </u>    |                     | <del></del>  |                                       |
| 1   | ,            | 461 21.4709106   | 521    | 22.8254244   | 581         | 24,1039416          | 641          | 25.3179778                            |
|     | 23.0499377   | 462 21.4941853   | 522    | 22.8473193   | 582         | 24.1246762          | 642          | 25.3377189                            |
|     | 20.0748599   | 463 21.5174348   | 523    | 22.8691933   | 583         | 24.1453929          | 643          | 25.3574447                            |
| 404 | 20.0997512   | 464 21.5406592   | 524    | 22.8910463   | 584         | 24,1660919          | 644          | 25.3771551                            |
| 405 | 20. f246118  | 465 21.5638587   | 525    | 22.9128785   | 585         | 24.1867792          | 645          | 25.8968502                            |
| 406 | 20.1494417   | 466 21,5870831   | 526    | 22.9346899   | 586         | 24.2074369          | 616          | 25.4165301                            |
| 407 | 20.1742410   | 467 21.6101828   | 527    | 22.9564806   | 587         | 24,2280829          | 647          | 25.4361947                            |
| 408 | 20.1990099   | 468 21.6333077   | 528    |              |             |                     | 648          |                                       |
| 409 | 20.2237484   |                  |        | 22.9782506   | 588         | 24.2487113          | 16 -         | 25.4558441                            |
|     |              | 469 21.6564078   | 529    | 23.0000000   | 589         | 24.2693222          | 649          | 25.4754784                            |
| 410 | 20.2484567   | 470 21,6794834   | 530    | 23.0217289   | 590         | 24.2899156          | 650          | 25.4950976                            |
| 411 | 20.2731849   | 471 21.7025344   | 501    | 22 242 1/22  | <del></del> | 24 0101010          |              | 3.5                                   |
| 412 | 20.2977831   |                  | 591    | 23.0434872   | 591         | 24.3104916          | 651          | 25.5147016                            |
| "   |              | 472 21.7255610   | 532    | 23.0651252   | 592         | 24.3310501          | 652          | 25.5342907                            |
| 413 | 20.3224014   | 473 21.7485692   | 533    | 23.0867928   | 598         | 24.851 <b>5</b> 918 | 653          | 25.5538647                            |
| 414 | 20.3469899   | 474 21.7715411   | 534    | 28.1084400   | 594         | 24,8721152          | 654          | 25.5734237                            |
| 415 | 20.3715488   | 475 21.7944947   | 535    | 23.1300670   |             | 24.8926218          | 655          | 25.5929678                            |
| 416 | 20.3960781   | 476 21.8174242   | 536    | 23.1516738   | 596         | 24.4131112          | 656          | 25.6124969                            |
| 417 | 20.4205779   | 477 21.8403298   | 537    |              |             | 24.4335894          |              |                                       |
| 418 | 20.4450483   | II I             | 1      | 23.1782605   | 597         |                     | 657          | 25.6320112                            |
| 419 |              | 1                | 538    | 23,1948270   | 11          | 24 4540385          | 658          | 25.6515107                            |
|     | 20.4694895   | 479 21.8860686   | 539    | 23.2163735   | 599         | 24.4744765          | 659          | 25.6709953                            |
| 420 | 20.4939015   | 480 21.9089023   | 540    | 23,2379001   | 600         | <b>24.494</b> 8974  | 660          | 25.6904651                            |
| 421 | 00 5100045   | 401 01 0017100   | 11     |              | ·           |                     |              |                                       |
|     | 20.5182845   | 481 21.9317122   | 541    | 23.2594067   | 601         | 24,5158013          | 661          | 25.7099203                            |
| 422 | 20.5426986   | 482 21.9544984   | 542    | 23.2808935   | 602         | 24.5356888          | 662          | 25.7293607                            |
| 423 | 20.5669638   | 483 21.9772610   | 548    | 23.3023604   | 603         | <b>24.55605</b> 83  | 663          | 25.7487864                            |
| 424 | 20.5912603   | 484 22.0000000   | 544    | 23.3238076   |             | 24.5764114          | 664          | 25.7681974                            |
| 425 | 20.6155281   | 485 22.0227155   | 545    | 23.3452351   |             | 24.5967478          | 665          | 25,7875939                            |
| 426 | 20,6397674   | 486 22.0454077   | 546    | 23.3666429   | 606         | 24.6170672          | 666          | 25.8069758                            |
| 427 | 20.6939783   | 487 22.0680765   | 547    |              | 1)          | I                   |              | 1                                     |
| 428 | 20.6881609   | 488 22.0907220   | 11     | 23.3880311   | 607         | 24,6373700          | 667          | 25.8263431                            |
| 429 |              |                  | 548    | 23.4093998   | 11          | 24.6576560          | 668          | 25.8456960                            |
|     | 20.7123152   | 489 22.1193444   | 549    | 23.4307490   | 609         | <b>24.677925</b> 3  | 669          | 25.8650343                            |
| 490 | 20.7364414   | 490 22.1359436   | 550    | 23.4520788   | 610         | 24.6981781          | 670          | 25.8843582                            |
| 431 | 20.7605395   | 491 22.1585198   | 11     |              |             |                     | ļ            |                                       |
|     |              |                  | 551    | 23.4733892   | 611         | 24.7184142          | 671          | 25.9036677                            |
| 432 | 20.7846097   | 492 22.1810730   | 552    | 23.4946802   | 612         | 24.7386338          | 672          | 25.9229628                            |
|     | 20.8086520   | 493 22.2036033   | 553    | 23.5159520   | 613         | 24.7588368          | 675          | 25.9422435                            |
| 434 | 20.8326667   | 494 22.2261108   | 554    | 28 5372046   | 614         | 24.7790234          | 674          | 25.9615100                            |
| 435 | 20.8566536   | 495 22.2485955   | 555    | 23.5584380   | 615         | 24.7991935          | 675          | 25.9807621                            |
| 436 | 20.8806130   | 496 22.2710574   | 556    | 23.5796522   | 616         | 24.8193473          | 676          | 26.0000000                            |
| 437 | 20.9045450   | 497 22.2934968   | 557    |              |             | •                   |              | 26.0192287                            |
| 438 | 20.9284495   | 498 22.3159136   | 11     | 23.6008474   | 617         | 24.8394847          | 677          | 1                                     |
| 439 | 20.9523268   | 1 1              | 538    | 23.6220236   | 618         | 24.8596058          | 678          | 26.0384331                            |
|     |              | 1                | 559    | 23,6431808   | 619         | 24.8797106          | 679          | 26 0576284                            |
| 440 | 20.9761770   | 500 22.3606798   | 560    | 23.6643191   | 620         | 24.8997992          | 680          | 26.0768096                            |
| 441 | 21.0000000   | 501 22.3830293   | 1-     | 100 0051005  |             | 31.0100             |              | 00 00 505.05                          |
| 442 | 1            | 1                | 561    | 28.6854386   | 621         | 24.9198716          | 681          | 26.0959767                            |
| 1   | 21.0237960   | 502 22.4053565   | 562    | 23.7065892   | 622         | 24.9399278          | 682          | 26.1151297                            |
| 443 | 21.0475652   | 508 22.4276615   | 563    | 28.7276210   | 623         | 24.9599679          | 683          | 26.1342687                            |
| 444 | 21.0713075   | 501 22, 1490441  | 564    | 23.7486842   | 624         | 24.9799920          | 684          | 26.1533937                            |
| 445 | 21.0950231   | 505 22.4722051   | 565    | 23.7697286   | 625         | 25.0000000          | 685          | 26.1725047                            |
| 446 | 21.1187121   | 506 22.4944438   | 566    | 23.7907545   | 626         | 25.0199920          | 686          | 26 1916017                            |
| 447 | 21.1423745   | 507 22.5166605   | 567    | 23.8117618   |             |                     | 11           | 26.2106848                            |
| 448 | 21.1660105   | 508 22.5388553   | 11     | I .          | 627         | 25.0399681          | 687          |                                       |
| 449 | 21.1896201   | 1 1              | 568    | 23.8327506   | 628         | 25.0599282          | 688          | 26.2297541                            |
| 450 |              |                  | 569    | 23.8537209   | 629         | 25.0798724          | 689          | 26.2488095                            |
| 230 | 21.2132034   | 510 22.5831796   | 570    | 23.8746728   | 630         | 25.0998008          | 690          | 26.2678511                            |
| 451 | 21.2367606   | 511 22.6059091   | -      | 00 0050000   |             | 1                   | <del> </del> | 00 4000000                            |
| 452 |              |                  | 571    | 28.8956063   | 631         | 25.1197184          | 691          | 26.2868789                            |
|     | 21.2602916   | 512 22.6274170   | 572    | 23.9165215   | 632         | 25.1896102          | 692          | 26.5058929                            |
| 453 | 21.2837967   | 513 22.6495033   | 573    | 23.9374184   | 633         | 25.1594913          | 693          | 26.3248932                            |
| 454 | 21.3072757   | 514 22.6715681   | 574    | 23.9582971   | 634         | 25.1793566          | 694          | 26.3438797                            |
| 455 | 21.3307290   | 515 22.6936114   | 575    | 23.9791576   | 635         | 25.1992063          | 695          | 26.3628527                            |
| 456 | 21.3541565   | 516 22.7156334   | 576    | 24.0000000   | 636         | 25.2190404          | 696          | 26.3818119                            |
| 457 | 21.3775583   | 517 22.7376340   | 577    | 24.0208243   |             |                     |              | 1                                     |
| 458 | 21.4009346   |                  | 11     |              | 637         | 25.2888589          | 697          | 26.4007576                            |
| 459 |              |                  | 578    | 24.0416906   | 638.        | 25.2586619          | 698          | 26.4196896                            |
|     | 21.4242853   | 519 22.7815715   | 579    | 24.0624189   | 639         | 25.2784498          | 699          | 26,4386081                            |
| 300 | 21 . 4476106 | 520 22 8035085   | II 58Q | 24.0831684   | .64Q        | 25 2982218          | 700          | 126.4575151                           |
|     |              |                  |        | <del></del>  | <del></del> |                     |              | <del></del>                           |

# TABLE LVIII. SQUARE ROOTS OF NUMBERS.

| 702         26.4952826         762         27.6043475         822         28.6705424         882         29.6984848         942         30.6           703         26.5141472         765         27.624546         823         28.8879766         883         29.7153159         943         30.7           705         26.5918361         765         27.6586334         825         28.728132         885         29.7489496         945         30.7           707         26.5894716         767         27.6947648         827         28.7576077         887         29.7825452         947         30.7           709         26.6083694         768         27.7128129         828         28.7749891         888         29.785452         947         30.7           710         26.6458252         770         27.7488799         890         28.7993601         889         29.8161030         949         30.8           711         26.6458327         771         27.7688688         831         28.8907206         890         29.8496231         950         30.8           712         26.6833281         771         27.7688686         831         28.8790581         894         28.893036         955         30.8   | re Root.                         |
|---|----------------------------------|
| 702         26.4958826         762         37.6043475         822         28.6705424         882         29.6984348         942         30.6           703         26.5141472         768         37.6924546         823         28.6705424         883         29.7153159         943         30.7           704         26.5329983         764         27.6405499         824         28.7054002         884         29.7321375         944         30.7           705         26.5518361         765         27.6486334         825         28.7576077         887         29.7825452         947         30.7           707         26.5894716         767         27.564863         827         28.7576077         887         29.7825452         947         30.7           709         26.6270539         769         27.7308492         829         28.79706         889         29.8161090         949         30.8           711         26.6458252         770         27.7488739         830         28.897006         891         29.8496291         951         30.8           711         26.6458327         771         27.7668868         831         28.870706         891         29.8663690         952         30.8<   |                                  |
| 703 26.5141472 763 27.624546 823 28.6879766 883 29.7153159 943 30.7 704 26.5329883 764 27.6405499 824 28.7054002 884 29.7321375 944 30.7 705 26.5518361 765 27.6586334 825 28.728132 885 29.7489496 945 30.7 706 26.5894716 767 27.6586384 827 28.7576077 887 29.7852452 947 30.7 708 26.6082694 768 27.7128129 828 27.749891 886 29.7057521 946 30.7 709 26.652694 768 27.7128129 828 28.7749891 889 29.8161030 949 30.8 710 26.6458252 770 27.7488739 830 28.8097206 899 29.8161030 949 30.8 711 26.66458252 770 27.7488739 830 28.8097206 899 29.8161030 949 30.8 712 26.6833281 772 27.89885818 831 29.8270706 891 29.8466231 951 30.8 712 26.6533281 772 27.8988528 832 28.8444102 892 29.8663690 953 30.8 713 26.7020598 773 27.8928776 835 28.8617394 899 29.881056 953 30.8 714 26.79207784 774 27.8926555 834 28.8790581 894 29.8998328 954 30.8 715 26.7581763 776 27.8567766 836 28.913664 896 29.9382501 955 30.9 717 26.7568557 777 27.8747197 837 28.930523 897 29.9499583 957 30.9 958 20.8 839 29.8663690 953 30.8 953 20.  | 757233                           |
| 704 26.5329983 764 27.6405499 824 28.7054002 884 29.7321375 944 30.7 705 26.5518861 765 27.658634 825 28.7226132 885 29.7489496 945 30.7 706 26.5706605 766 27.6767050 826.5894716 767 27.6947648 827 28.7576077 887 29.76852452 947 30.7 708 26.6082694 768 27.7128129 828 28.7749891 888 29.7993269 948 30.7 709 26.6458252 770 27.7488739 830 28.8097206 889 29.8161090 710 26.6458252 770 27.7488739 830 28.8097206 890 29.8328678 950 30.8 711 26.66458252 770 27.7488739 830 28.8097206 890 29.8328678 950 30.8 712 26.6833281 772 27.7668868 831 28.8270706 891 29.8496231 951 30.8 712 26.6833281 772 27.2848880 832 28.8444102 892 29.8663690 953 30.8 713 26.7020598 773 27.8028775 833 28.8617394 893 29.8831056 953 30.8 715 26.7207784 774 27.8208555 834 28.8790581 894 29.898328 954 30.8 715 26.7394839 775 27.8587676 836 28.9136646 896 29.9325291 955 30.8 715 26.7768557 777 27.8547197 897 28.995358 897 29.9499583 957 30.9 716 26.8141753 779 27.9105715 839 28.9654967 899 29.9853287 959 30.9 712 26.8141753 779 27.9105715 839 28.9654967 899 29.9853287 959 30.9 712 26.8141753 779 27.9105715 839 28.985755 900 30.0000000 960 960 96.9 724 26.9072481 784 28.050504 842 29.0174962 902 80.033148 962 31.0 724 26.9072481 784 28.050500 844 29.0516781 904 50.0665928 964 31.0 725 26.9258240 785 28.0535203 847 29.0680791 906 30.0932179 965 31.0 726 26.992975 787 28.0535203 847 29.0680791 906 30.0932179 965 31.0 727 26.9629375 787 28.0535203 847 29.1074962 902 80.033148 962 31.0 725 26.992975 787 28.0535203 847 29.1074962 902 80.033148 962 31.0 726 26.992975 787 28.0535203 847 29.1074962 902 80.033148 962 31.0 728 26.9914751 788 28.0713577 848 29.1074969 908 30.1496269 966 31.0 726 26.9914751 788 28.0713577 848 29.1074969 908 30.1496269 969 31.1 727 27.054985 792 28.1069386 850 29.1547595 910 90.1668062 970 31.1 731 27.0370117 791 28.1247222 851 29.1719043 911 30.1827655 971 31.1 731 27.0370117 791 28.134794 852 29.2061637 913 30.2489690 973 31.1 732 27.054985 792 28.1424946 852 29.289380 915 30.2489690 975 31.2 7.0924344 794 28.1780056 854 29.223278  | 083051                           |
| 705         26.5518361         765         27.6586394         825         28.7228132         885         29.7489496         945         30.7           706         26.5894716         767         27.6767050         826         28.7402157         886         29.7657521         946         30.7           708         26.6083694         768         27.7128129         828         28.77408157         886         29.7893269         948         30.7           709         26.6685829         770         27.7468739         830         28.8097206         890         29.8161090         949         90.8           711         26.6645832         771         27.7668868         831         28.8270706         891         29.8663690         952         30.8           712         26.7920598         773         27.802875         833         28.8617394         893         29.8851056         953         30.8           713         26.7920598         773         27.802875         834         28.790581         894         29.898328         952         30.8           715         26.7920598         775         27.8928518         835         28.8617394         893         29.881056         953         30.8   | 245830                           |
| 706         28.5706605         766         27.6767050         896         28.7402157         886         29.7657521         946         30.7           707         26.5894716         767         27.6947648         827         28.77576077         887         29.7825452         947         30.7           709         26.6370539         769         27.7488739         830         28.7793601         889         29.8161030         949         30.8           711         26.66458252         771         27.768868         831         29.8270706         891         29.8496231         950         30.8           712         26.6645832         771         27.768868         831         29.8270706         891         29.8496231         951         30.8           712         26.6790784         772         27.848880         832         28.844102         892         29.8663601         952         30.8           713         26.7394839         775         27.888218         895         28.8963666         895         29.9165506         955         30.9           716         26.7394839         775         27.8747197         897         28.9893528         897         29.9165506         955         30.   | 408523                           |
| 708         26.6082694         768         27.7128129         828         28.7749891         888         29.7993269         948         30.7           709         26.6458252         770         27.7468739         830         28.8097206         890         29.8161030         949         30.8           711         26.6458252         770         27.7468739         830         28.8097206         891         29.8463231         950         30.8           711         26.6845832         771         27.7688868         831         28.870706         891         29.8663690         950         30.8           712         26.6833281         772         27.864880         832         28.8444102         892         29.8663690         952         30.8           713         26.700784         774         27.808555         834         28.8790581         894         29.8998328         954         90.8           716         26.3768439         777         27.8747197         878.8926514         838         28.9136646         896         39.9332591         956         30.9         31.0         30.9         39.9332591         956         30.9         39.7         30.9         39.9332591         956         30.   | 571130                           |
| 709         28.6370539         769         27.7308492         829         28.7923601         889         29.8161030         949         30.8           710         26.6458252         770         27.7488739         830         28.8097206         890         29.8328678         950         30.8           711         26.6645832         771         27.7688868         831         29.8270706         891         29.8496231         951         30.8           713         26.7020598         773         27.868868         831         29.8770706         891         29.8663690         952         30.8           713         26.770784         774         27.882818         835         28.8617394         893         29.8891056         953         30.8           715         26.7394839         775         27.888218         895         28.8963666         895         29.9165506         955         30.9           716         26.7594839         777         27.8747197         897         28.990523         897         29.9165506         955         30.9           712         26.7594857         777         27.8747197         897         28.9805293         897         29.993332591         965         90.   | 73 <b>365</b> 1                  |
| 710         26.6458252         770         27.7468739         830         28.8097206         890         39.8328678         950         30.8           711         36.6645832         771         27.7668863         831         28.8270706         891         29.8496231         951         30.8           712         26.6833281         772         27.7848880         832         28.8444102         892         29.8663690         953         30.8           714         26.720784         774         27.8208555         833         28.8617994         899         29.889328         953         30.8           715         26.7394839         775         27.8388218         895         28.8963666         895         29.9165506         955         30.8           716         26.758520         776         27.8747197         837         28.9309528         897         29.9499583         957         30         957         30         957         30         99.9499583         979.999.9499583         971         26.8141753         779         27.97647197         837         28.9309528         897         29.9499583         979         90.9         99.9583287         790         99.96832281         99.959         90.99   |                                  |
| 711 26.6645832 771 27.7668868 831 29.8270706 891 29.8496231 951 80.8 712 26.6833281 772 27.7688860 832 28.8444102 892 29.8663690 952 30.8 713 26.7920784 774 27.828555 834 28.8790581 894 29.8998328 954 30.8 715 26.7394839 775 27.888218 895 28.8963666 895 29.9165506 955 30.8 716 26.7584839 776 27.8567766 836 28.9136646 896 29.9332591 956 30.9 717 26.7768557 777 27.8747197 897 28.9309523 897 29.9499583 957 30.9 718 26.7955200 778 27.8926514 838 28.9482297 898 29.9666481 958 30.9 712 26.8141753 779 27.97105715 839 28.9654967 899 29.883287 959 30.9 720 26.8328157 780 27.9284801 840 28.9827535 900 30.0000000 960 30.9 721 26.8514432 781 27.9463772 841 29.0000000 901 30.0166620 961 31.0 722 26.9072481 784 28.0000000 844 29.0516781 904 30.066528 963 963 963 963 963 963 963 963 963 963  | 2207 <b>0</b> 0                  |
| 712         26.6833281         772         27.7848880         832         28.8444102         892         29.8663690         952         30.8           713         26.7020598         774         27.8288528         83         28.8617994         892         29.8881036         953         30.8         30.8         714         26.7207784         774         27.8526555         834         28.8790581         894         29.8998328         954         30.8         715         26.7394839         776         27.8567766         836         28.9136646         896         39.9332591         956         90.8         717         26.7768557         777         27.8747197         837         28.9309528         897         29.9499583         957         30.9         958         90.99         99.9499583         977         70.92         26.8328157         779         27.9105715         839         28.9654967         899         29.9833287         959         90.9         960.99         960.99         960.99         960.99         960.99         960.99         960.99         960.99         960.99         960.99         960.99         960.99         99.9833287         960         960.99         960.99         960.99         960.99         960.99         <  | 000070                           |
| 713 26.7020598 773 27.8028775 833 28.8617394 893 29.8831056 953 30.8 714 26.7920784 774 27.852655 834 28.8790581 894 29.8998328 954 30.8 715 26.7954839 775 27.858218 835 28.8963666 895 29.9165506 955 30.9 716 26.758577 777 27.8747197 837 28.930523 897 29.9499583 957 30.9 717 26.7955200 778 27.852614 838 28.9309523 897 29.9499583 957 30.9 712 26.8141753 779 27.9105715 839 28.9654967 899 29.9853287 959 30.9 720 26.8328157 780 27.9284801 840 28.9827535 900 30.0000000 960 30.9 721 26.8514432 781 27.9463772 841 29.000000 90 30.0166620 961 31.0 722 26.8700677 782 27.9642629 842 29.0173962 902 30.0333148 962 31.0 722 26.9072481 784 28.000080 844 29.0516781 904 30.0665928 964 31.0 725 26.9436872 786 28.0356915 846 29.0668837 905 30.0832179 965 31.0 726 26.9436872 786 28.0356915 846 29.0668837 905 30.0832179 965 31.0 726 26.9629375 787 28.0535203 847 29.1032644 907 30.1164407 967 31.0 729 27.0000000 790 28.1069386 850 29.1204896 908 30.1330383 968 31.1 729 27.0000000 790 28.1069386 850 29.1547595 910 30.1692629 970 31.1 731 27.0370117 791 28.1247222 851 29.1719043 911 30.1827765 971 31.1 732 27.0554985 792 28.1424946 852 29.1890390 912 30.1993377 972 38.1602557 793 28.1602557 853 29.2061637 913 30.2158899 973 31.1 734 27.092434 794 28.1780056 854 29.223784 914 30.2324329 974 31.2 7.092434 794 28.1780056 854 29.223784 914 30.2324329 974 31.2 7.092434 794 28.1780056 854 29.223784 914 30.2324329 974 31.2 7.092434 794 28.1780056 854 29.223784 914 30.2324329 975 31.1 735 27.108834 795 28.134720 856 29.223784 914 30.2324329 974 31.2 7.092434 797 28.2134720 856 29.2574577 7916 30.2654969 977 31.2 7.0754985 799 28.2134780 856 29.2745623 917 30.2820079 977 31.2 7.1477439 797 28.2311884 857 29.2745623 917 30.2820079 977 31.2   | 544 <b>972</b>                   |
| 714 26.7207784 774 27.8208555 884 28.8790581 894 29.8998328 954 90.8 715 26.7394839 775 27.8838218 895 28.8963666 895 29.9165506 955 30.9 716 26.3581763 776 27.856776 836 28.9136646 896 39.9392591 956 90.9 717 26.7768557 777 27.8747197 897 28.9309523 897 29.9499583 897 29.9499583 718 26.7955220 778 27.8926514 838 28.9482297 898 29.9666481 958 90.9 712 26.8141753 780 27.9284801 840 28.9827535 900 30.000000 960 30.9 720 26.8328157 780 27.9284801 840 28.9827535 900 30.000000 960 30.9 721 26.8514432 781 27.9463772 841 29.000000 901 30.0166620 961 31.0 722 26.8700577 782 27.9642629 842 29.0172362 902 90.0333144 962 31.0 722 26.8700577 782 27.9642629 842 29.0172362 902 90.0333144 962 31.0 722 26.8700577 782 27.9642629 842 29.0172362 902 90.0333144 962 31.0 722 26.8700577 782 27.9642629 842 29.0172362 902 90.0333144 962 31.0 722 26.8700577 782 27.9642629 842 29.0172362 902 90.0333144 962 31.0 722 26.8700577 782 27.9821371 843 29.0344623 903 30.0499584 963 31.0 722 26.9625840 785 28.0178515 845 29.0680837 905 30.0832179 965 31.0 722 26.9629375 787 22.0535203 847 29.1032644 907 30.1164407 967 31.0 722 27.0000000 790 28.106986 850 29.1547595 910 90.1669062 970 31.1 722 27.0050000 790 28.106986 850 29.1547595 910 90.1669062 970 31.1 722 27.0050000 790 28.106986 850 29.1547595 910 90.1669062 970 31.1 722 27.0054044 794 28.106986 850 29.1547595 910 90.1669062 970 31.1 722 27.005444 794 28.1780056 854 29.223784 914 30.2224329 974 31.2 7.0324344 794 28.1780056 852 29.1890390 912 30.1993977 972 31.1 722 27.0324344 794 28.1780056 854 29.223784 914 30.2224329 974 31.2 7.0924344 794 28.1780056 854 29.223784 914 30.2224329 974 31.2 7.0924344 794 28.1780056 854 29.223784 914 30.2224329 974 31.2 7.0924344 794 28.1780056 856 29.223784 914 30.2224329 974 31.2 7.0924344 794 28.1780056 856 29.223784 914 30.2224329 974 31.2 7.0924344 794 28.1780056 856 29.223784 914 30.2224329 974 31.2 7.0924344 794 28.1780056 856 29.223784 914 30.2224329 974 31.2 7.0924344 794 28.1780056 856 29.223784 914 30.2224329 974 31.2 7.0924344 794 28.1780056 856  | 706981                           |
| 715         26.7394839         775         27.8888218         895         28.8963666         895         29.9165506         95.5         30.9           716         26.73681763         776         27.8567767         836         28.9136646         896         29.9332591         956         30.9           717         26.7768557         777         27.8747197         837         28.9309528         897         29.9499583         957         30.9           712         26.8141753         779         27.9105715         839         28.9654967         899         29.9883237         959         90.9           721         26.8514439         781         27.9463772         841         29.000000         901         30.0166680         961         31.0           722         26.8700577         782         27.9642629         842         29.0172862         902         30.033148         962         31.0           722         26.8700577         782         27.9642629         842         29.0172862         902         30.033148         962         31.0           724         26.9072481         784         28.0000060         844         29.0516781         904         30.0665928         964         3   | 868904                           |
| 717 26.7768557 777 27.8747197 897 28.9309523 897 29.9499583 957 30.9 9718 26.7955220 778 27.8926514 838 28.9482297 898 29.9666481 958 30.9 972 26.8328157 780 27.9284801 840 28.9827535 900 90.0000000 960 30.9 721 26.85144732 781 27.9463772 841 29.000000 901 30.0166620 961 31.0 822 26.8700677 782 27.9642629 842 29.0173862 902 90.0333148 962 31.0 822 26.8586593 783 27.9821371 843 29.034623 903 30.0499584 963 91.0 822 26.9072481 784 28.000080 844 29.0516781 904 30.0665928 964 31.0 822 26.943872 786 28.0356915 846 29.0860791 905 30.0823179 965 31.0 822 26.9629375 787 28.0535915 846 29.0860791 906 30.098389 966 31.0 822 27.0000000 787 28.0535915 846 29.0860791 906 30.098839 966 31.0 822 27.0000000 828.069388 847 29.1032644 907 30.1164407 967 31.0 822 27.0000000 828.069388 847 29.1032644 907 30.1164407 967 31.0 822 27.0000000 828.069388 849 29.1264896 908 30.1330383 968 31.1 827.0554985 790 28.1069386 850 29.1547595 910 30.1669069 970 31.1 822 27.0554985 792 28.1424722 851 29.1719043 911 30.1827765 971 31.1 822 27.0554985 792 28.1424722 851 29.1719043 911 30.1827765 971 31.1 822 27.054984 794 28.1780056 854 29.2232784 914 30.2324329 974 31.2 87.0924344 794 28.1780056 854 29.2232784 914 30.2324329 973 31.1 827.092434 794 28.1780056 854 29.2232784 914 30.2324329 974 31.2 87.0924344 794 28.1780056 854 29.2232784 914 30.2324329 974 31.2 87.1283199 796 28.2134720 856 29.2574777 916 30.2654919 975 31.2 87.1283199 796 28.2134720 856 29.2574777 916 30.2654919 975 31.2 87.1283199 797 28.2134780 856 29.2745623 917 30.2820079 977 31.2  | 030743                           |
| 718         26.7955220         778         27.8926514         838         28.9482297         898         29.9666481         958         90.9           712         26.8141753         779         27.9105715         839         28.9654967         899         29.98832287         959         30.90         90.99         30.000000         960         30.9         30.9         30.000000         960         30.9         30.9         30.000000         960         30.9         30.9         30.000000         960         30.9         30.9         30.000000         960         30.9         30.9         30.000000         960         30.9         30.9         30.000000         960         30.9         30.9         30.000000         960         30.9         30.9         30.000000         960         30.9         30.9         30.000000         960         30.9         30.9         30.000000         960         30.9         30.000000         960         30.9         30.000000         961         31.0         31.0         30.000000         962         31.0         30.0000000         962         31.0         30.0000000         962         31.0         30.0000000         962         31.0         30.00000000         964         31.0   | 192497                           |
| 712         26.8141753         779         27.9105715         839         28.9654967         899         29.9833287         959         90.9           720         26.8328157         780         27.9284801         840         28.9827535         900         30.000000         960         30.9           721         26.8514432         781         27.9463772         841         29.0000000         901         30.0166620         961         31.0           722         26.8700577         782         27.9642629         842         29.0172862         902         30.0333148         962         31.0           724         26.9072481         784         28.0000000         844         29.0516781         904         30.065928         964         31.0           725         26.9258240         785         28.0178515         845         29.068837         905         30.0832179         965         31.0           726         26.9443872         786         28.0356915         846         29.0860791         906         90.0998399         966         31.0           729         26.9629375         787         28.0535203         847         29.1034964         907         30.1164407         967         31.   |                                  |
| 720         26.8328157         780         27.9284801         840         28.9827535         900         30.0000000         960         90.9           721         26.8514493         781         27.9463772         841         29.0000000         901         30.0166620         961         31.0           722         26.8700677         782         27.9642629         842         29.0172362         902         30.0333148         962         31.0           723         26.8886593         784         27.9821371         843         29.0344623         903         30.0495644         963         91.0           725         26.9528240         785         28.0178315         845         29.0688837         905         30.0685928         965         31.0           726         26.9443872         786         28.0356915         846         29.0860791         906         30.0998839         966         31.0           727         26.9629375         787         28.0535203         847         29.1032644         907         30.1164407         967         \$1.0           729         27.0000000         789         28.0941438         849         29.1376046         909         30.1496289         968   | 67 <b>72</b> 51                  |
| 722         26.8700677         782         27,9642629         842         29.0178362         902         30.0333148         962         31.0           723         28.8886593         783         27.9821371         843         29.0344623         903         30.0499584         963         31.0           724         26.9072481         784         28.000000         844         29.0516781         904         30.0665928         964         31.0           725         26.9528240         785         28.0178515         845         29.0680791         905         30.0832179         965         31.0           726         26.9443872         786         28.0535203         847         29.1082644         907         30.1164407         967         \$1.0           729         27.0000000         789         28.0691438         849         29.1376046         909         30.1496289         968         31.1           790         28.1069386         850         29.1547595         910         30.1699085         969         31.1           731         27.0370117         791         28.1247222         851         29.1719043         911         30.1827765         971         31.1           732  | <b>8</b> 38 <b>66</b> 8          |
| 722         26.8700677         782         27,9642629         842         29.0178362         902         30.0333148         962         31.0           723         28.8886593         783         27.9821371         843         29.0344623         903         30.0499584         963         31.0           724         26.9072481         784         28.000000         844         29.0516781         904         30.0665928         964         31.0           725         26.9528240         785         28.0178515         845         29.0680791         905         30.0832179         965         31.0           726         26.9443872         786         28.0535203         847         29.1082644         907         30.1164407         967         \$1.0           729         27.0000000         789         28.0691438         849         29.1376046         909         30.1496289         968         31.1           790         28.1069386         850         29.1547595         910         30.1699085         969         31.1           731         27.0370117         791         28.1247222         851         29.1719043         911         30.1827765         971         31.1           732  | 000000                           |
| 728         26.8886593         783         27.9821371         843         29.0344623         903         30.0499584         963         \$1.0           724         26.9072481         784         28.0000060         844         29.0516781         904         30.0665928         964         \$1.0           725         26.9528240         785         28.0178515         845         29.0668837         905         30.0932179         965         \$1.0           726         26.9443872         786         28.0535203         847         29.0860791         906         30.0988399         966         \$1.0           728         28.9814751         788         28.0713377         848         29.1324896         908         30.1330383         968         \$1.0           729         27.0000000         789         28.0691438         849         29.1376046         909         30.1496259         969         \$1.1           731         27.0370117         791         28.1247222         851         29.1719043         911         30.1827765         971         \$1.1           732         27.07354985         792         28.1602557         853         29.2061637         913         30.2158899         973 <td< td=""><td>161248</td></td<>   | 161248                           |
| 725         26.9258240         785         28.0178515         845         29.0688837         905         30.0832179         965         31.0           726         26.9443872         786         28.0356915         846         29.0860791         906         30.0998399         966         \$1.0           727         26.9629375         787         28.0535203         847         29.1032644         907         30.116407         967         31.0           728         26.9814751         788         28.0713377         848         29.1204896         908         30.1330883         968         \$1.1           729         27.0000000         789         28.069386         859         29.1547595         910         30.1496289         969         31.1           731         27.0370117         791         28.1247222         851         29.1719043         911         30.1827765         971         31.1           732         27.0739727         793         28.1602557         853         29.2061637         913         30.2158899         973         31.1           735         27.1108834         795         28.1780056         854         29.2232784         914         30.2324329         974         31   | 322413                           |
| 726         26.9443872         786         28.0356915         846         29.0860791         906         90.0998389         966         31.07           727         26.9629375         787         28.0535203         847         29.1032644         907         30.1164407         967         31.0           728         26.9614751         788         28.0713377         848         29.1204396         908         30.1330839         968         31.1           799         27.0000000         789         28.0891438         849         29.1376046         909         30.1496269         968         31.1           731         27.0370117         791         28.169386         850         29.1547595         910         30.1668062         970         31.1           731         27.0370117         791         28.14247222         851         29.1719043         911         30.1827765         971         31.1           732         27.0739727         793         28.1602557         853         29.2061637         913         30.2158899         973         31.1           734         27.108884         795         28.1780056         854         29.2328784         914         30.2324329         974  | 483494                           |
| 727         26.9629375         787         28.0535203         847         29.1032644         907         30.1164407         967         31.0           728         28.9814751         788         28.0713377         848         29.1204896         908         30.1330383         968         31.1           729         27.000000         789         28.0691438         849         29.1376046         909         30.1496269         969         31.1           730         27.0185122         790         28.1069386         850         29.1547595         910         30.1692669         969         91.1           731         27.0570117         791         28.1247222         851         29.1719043         911         30.1827765         971         31.1           732         27.0739727         793         28.1602557         853         29.2061637         913         30.2158899         973         31.1           734         27.0924344         794         28.1780056         854         29.2232784         914         30.2243299         974         31.2           736         27.1293199         796         28.2134720         856         29.27445623         915         30.2854919         975  |                                  |
| 728         26.9814751         788         28.0713377         848         29.1204896         908         30.1330883         968         31.1           729         27.0000000         789         28.0891438         849         29.1376046         909         30.1496269         969         31.1           731         27.0370117         791         28.1247222         851         29.1719043         911         30.1827765         971         31.1           732         27.0554985         792         28.1424946         852         29.1890390         912         30.1993377         972         31.1           734         27.0739727         798         28.1602557         853         29.2061637         913         30.2158899         973         31.1           734         27.0924344         794         28.1780056         854         29.2232784         914         30.23243929         974         31.2           735         27.1108834         795         28.2154720         856         29.2574777         916         30.2654919         975         31.2           737         27.1477439         797         28.2311684         857         29.2745623         917         30.2820079         977 <td< td=""><td>966236</td></td<>  | 966236                           |
| 729         27.0000000         789         28.0891438         849         29.1376046         909         30.1496269         969         31.1           730         27.0185122         790         28.1069886         850         29.1547595         910         30.1668062         970         31.1           731         27.0570117         791         28.1247292         851         29.1719043         911         30.1827765         971         31.1           732         27.0739727         792         28.1424946         852         29.1890390         912         30.1993377         972         31.1           734         27.0739727         793         28.1602557         853         29.2061637         913         30.2158899         973         31.1           735         27.1108834         795         28.1780056         854         29.2232784         914         30.2324329         974         31.2           736         27.1293199         796         28.2134720         856         29.2574777         916         30.2654919         976         31.2           737         27.1477439         797         28.2311684         857         29.2745623         917         30.2820079         977  | 126984                           |
| 731 27,0370117 791 28.1247222 851 29.1719043 911 30.1827765 971 31.1 732 27.0554985 792 28.1424946 852 29.1890390 912 30.1993977 972 31.1 734 27.0924344 794 28.1780056 854 29.2232784 914 30.2324329 974 31.2 7.35 27.1108834 755 28.1957443 855 29.2403830 915 30.24329 974 31.2 736 27.1293199 796 28.2134720 856 29.2574777 916 30.2654919 976 31.2 737 27.1477439 797 28.2311884 857 29.2745623 917 30.2820079 977 31.2  | 287648                           |
| 182   27.0554985   792   28.1424946   852   29.1890390   912   30.1993377   972   31.1   785   27.0739727   799   28.1602557   853   29.261637   913   30.2158899   973   31.1   734   27.0924344   794   28.1780056   854   29.2232784   914   30.23248329   974   31.2   735   27.1108834   795   28.1957443   855   29.2403850   915   30.2489669   975   31.2   736   27.1293199   796   28.2134720   856   29.2574777   916   30.2654919   976   31.2   737   27.1477439   797   28.2311884   857   29.2745623   917   30.2820079   977   31.2   | 448230                           |
| 783         27.0739727         793         28.1602557         853         29.2061637         913         30.2158899         973         31.1           734         27.0924344         794         28.1780056         854         29.2232784         914         30.2234829         974         31.2           735         27.1198834         795         28.1957443         855         29.2403830         915         30.243969         975         51.2           736         27.1293199         796         28.2134720         856         29.2574777         916         30.2654919         976         31.2           737         27.1477439         797         28.2311684         857         29.2745623         917         30.2820079         977         31.2   | 608729                           |
| 734     27.0924344     794     28.1780056     854     29.2232784     914     30.2324329     974     31.2       735     27.1108634     795     28.1957443     855     29.2403830     915     30.2489669     975     31.2       756     27.1293199     796     28.2134720     856     29.2574777     916     30.2654919     976     31.2       737     27.1477439     797     28.2311684     857     29.2745623     917     30.2820079     977     31.2   | 769145                           |
| 735 27.1108834 795 28.1957443 855 29.2403830 915 30.2489669 975 31.2<br>736 27.1293199 796 28.2134720 856 29.2574777 916 30.2654919 976 31.2<br>737 27.1477439 797 28.2311884 857 29.2745623 917 30.2820079 977 31.2  |                                  |
| 736 27.1293199 796 28.2134720 856 29.2574777 916 30.2654919 976 31.2<br>737 27.1477439 797 28.2311884 857 29.2745623 917 30.2820079 977 31.2  | 249900                           |
| 737 27.1477439 797 28.2311684 857 29.2745623 917 30.2820079 977 31.2  | 409987                           |
| - red log secreta il mon lon pagenno il neglion consegno il pro lon consegna il pro-lon   | 569992                           |
| The last transfer of the last   | 729915                           |
|   | 889757<br>049517                 |
|   |                                  |
| The state of the s  | 209195                           |
| 110   110   100   1 | 368792<br>528308                 |
|   | 687 <b>74</b> 3                  |
| The latest open la  | 847097                           |
|   | 006369                           |
| 747 27.8313007 807 28.4077454 867 29.4448637 927 80.4466747 987 31.4  | 165561                           |
| The latter was latter and latter   | 32 <b>467</b> 3                  |
| 10. 10. 1   | 483704<br><b>64265</b> 4         |
|   |                                  |
| Me attended to a file transport to any least and a file  | 801 <i>525</i><br>96031 <i>5</i> |
|   | 119025                           |
|   | 277655                           |
|   | 436206                           |
| 156   27.4954542  | 594677                           |
|   | 753068                           |
|   | 911380<br>069612                 |
| 160 27.5680575 820 28.6586421 880 29.6647939 39.66594194 1000 131.6   |                                  |
|   |                                  |

TABLE LIX.
CUBE ROOTS OF NUMBERS, FROM 1 TO 800.

| -        |            | Total |            |             |            |          |                    |      |            |
|----------|------------|-------|------------|-------------|------------|----------|--------------------|------|------------|
| Num.     | Cube Root. | Num-  | Cube Root. | Num.        | Cube Root. | Num.     | Cube Root.         | Num. | Cube Root. |
| 1        | 1.000000   | ,61   | 3.936497   | 121         | 4.946088   | 181      | 5.656652           | 241  | 6.223084   |
| 2        | 1,259921   | 62    | 3.957892   | 122         | 4.959675   | 182      | 5.667051           | 242  | 6.231680   |
| 8        | 1.442250   | 63    | 3.979057   | 123         | 4.973190   | 183      | 5.677411           | 943  | 6.240253   |
| 4        | 1.587401   | 64    | 4.000000   | 124         | 4.986631   | 184      | 5.687734           | 244  | 6.248801   |
| 5        | 1.709976   | 65    | 4.02)726   | 125         | 5.000000   | 185      | 5.698019           | 245  | 6.257324   |
| 6        | 1 817121   | 66    | 4.041240   | 126         | 5.013398   | 186      | 5.708267           | 246  | 6.265826   |
| 7        | 1.912933   | 67    | 4.061548   | 127         | 5.026526   | 187      | 5.718479           | 247  | 6.274305   |
| 8        | 2.000000   | 68    | 4.081053.  | 128         | 5.039684   | 188      | 5.728654           | 248  | 6.282761   |
| 9        | 2.080084   | 69    | 4.101566   | 129         | 5.052774   | 189      | 5.738794           | 249  | 6.299194   |
| 10       | 2.154405   | 70    | 4.121285   | 130         | 5.065797   | 190      | 5.748897           | 250  | 6.299605   |
| 11       | 2.223980   | 71    | 4.140818   | 131         | 5.078753   | 191      | 5.758965           | 251  | 6.307993   |
| 12       | 2.289428   | 72    | 4.160168   | 132         | 5.091643   | 192      | 5.768998           | 252  | 6.316360   |
| 13       | 2.351335   | 73    | 4.179339   | 133         | 5.104469   | 193      | 5.778996           | 253  | 6.324704   |
| 14       | 2.410142   | 74    | 4.198336   | 134         | 5.117230   | 194      | 5.788960           | 254  | 6.333025   |
| 15       | 2.466212   | 75    | 4.217163   | 135         | 5.129928   | 195      | 5.798890           | 255  | 6.341325   |
| 16       | 2.519842   | 76    | 4.235824   | 136         | 5.142563   | 196      | 5.808786           | 256  | 6.349604   |
| 17       | 2.571282   | 77    | 4.254321   | 137         | 5.155187   | 197      | 5.818648           | 257  | 6.357861   |
| 18       | 2.620741   | 78    | 4.272659   | 138         | 5.167649   | 198      | 5.828476           | 258  | 6.366098   |
| 19       | 2.668402   | 79    | 4.290841   | 139         | 5.180101   | 199      | 5.838272           | 259  | 6.374312   |
| 20       | 2.714418   | 80    | 4.308870   | 140         | 5.192494   | 200      | 5.848035           | 260  | 6.382504   |
| -:-      |            |       |            | <del></del> |            | <u> </u> |                    |      |            |
| 21       | 2.758923   | 81    | 4.326749   | 141         | 5.204828   | 201      | 5.857765           | 261  | 6.390677   |
| 22       | 2.802039   | 82    | 4.344481   | 142         | 5.217103   | 202      | 5.867464           | 262  | 6.598829   |
| 23       | 2.843867   | 83    | 4.362071   | 143         | 5.229321   | 203      | 5.877131           | 263  | 6.406959   |
| 24       | 2.884499   | 84    | 4.379519   | 144         | 5.241482   | 204      | 5.886766           | 264  | 6.415068   |
| 25       | 2.924018   | 85    | 4.396830   | 145         | 5.253588   | 205      | 5.896369           | 265  | 6.423157   |
| 26<br>27 | 2.962496   | 86    | 4.414005   | 146         | 5.265637   | 206      | 5.905941           | 266  | 6.431228   |
| 28       | 3.000000   | 87    | 4.431047   | 147         | 5.277632   | 207      | 5.915482           | 267  | 6.439278   |
|          | 3.006589   | 88    | 4.447960   | 148         | 5.289572   | 208      | 5.924992           | 268  | 6 447306   |
| 29       | 3.072317   | 89    | 4.464745   | 149         | 5.301459   | 209      | 5.934472           | 269  | 6.455315   |
| 30       | 3.107232   | 90    | 4.481405   | 150         | 5.313293   | 210      | 5.943921           | 270  | 6.463304   |
| 81       | 3.141381   | 91    | 4.497942   | 151         | 5.325074   | 211      | 5.953342           | 271  | 6.471274   |
| 32       | 3.174802   | 92    | 4.514857   | 152         | 5.336803   | 212      | 5.962738           | 272  | 6.479924   |
| 83       | 3.207534   | 93    | 4.580655   | 153         | 5.348481   | 213      | 5.972098           | 273  | 6.487154   |
| 34       | 3.239612   | 94    | 4.546836   | 154         | 5.360108   | 214      | 5.981425           | 274  | 6.495065   |
| 85       | 3.271066   | 95    | 4.562903   | 155         | 5.371685   | 215      | . 5.990727         | 275  | 6.502957   |
| 86       | 3.301927   | 96    | 4.578857   | 156         | 5.383213   | 216      | 6.000000           | 276  | 6.510831   |
| 87       | 3.332222   | 97    | 4.594701   | 157         | 5.394690   | 217      | 6.009244           | 277  | 6.518685   |
| 38       | 3.361975   | 98    | 4.610436.  | 158         | 5.460120   | 216      | 6.018461           | 278  | 6.526590   |
| 89       | 3.391211   | 99    | 4.626065   | 159         | 5.417501   | 219      | 6.027650           | 279  | 6.534335   |
| 40       | 3.419952   | 100   | 4.641589   | 160         | 5.428835   | 220      | 6.036810           | 280  | 6.542132   |
| 41       | 3.448217   | 101   | 4.657010   | 161         | 5.440122   | 221      | 6.045943           | 281  | 6.549911   |
| 42       | 3.476027   | 102   | 4.672330   | 162         | 5.451362   | 222      | 6.055050           | 282  | 6.557672   |
| 43       | 3.503398   | 103   | 4.687548   | 163         | 5.462556   | 223      | 6.064128           | 283  | 6.565415   |
| 44       | 3.530348   | 104   | 4.702669   | 164         | 5.473703   | 224      | 6.073178           | 284  | 6.578139   |
| 45       | 3.556893   | 105   | 4.717694   | 165         | 5.484806   | 225      | 6.082201           | 295  | 6.580845   |
| 46       | 3.583048   | 106   | 4.792624   | 166         | 5.495865   | 226      | 6.091199           | 286  | 6.588533   |
| 47       | 3.608826   | 107   | 4.747459   | 167         | 5.506879   | 227      | 6.100171           | 287  | 6.596203   |
| 48       | 3.634241   | 108   | 4.762203   | 168         | 5.517848   | 228      | 6.109115           | 288  | 6.603855   |
| 49       | 3.659306   | 109   | 4.776856   | 169         | 5.528775   | 229      | 6.118032           | 289  | 6.611489   |
| 50       | 3.684031   | 110   | 4.791420   | 170         | 5.539658   | 230      | <b>6.</b> 126925 . | 290  | 6.619105   |
| 61       | 3.708490   | 111   | 4.805896   | 171         | 5.550499   | 20X      | 6.135792           | 291  | 6.626705   |
| 52       | 3.732511   | 112   | 4.820284   | 172         | 5.561298   | 835      | 6.144684           | 292  | 6.634288   |
| 53       | 3.756286   | 113   | 4.884588   | 173         | 5.572054   | 293      | 6.153450           | 298  | 6.641853   |
| 54       | 3:779766   | 114   | 4.848808   | 174         | 5.582770   | 234      | 6.162240           | 294  | 6.649400   |
| 55       | 3.802958   | 115   | 4.862944   | 175         | 5.593445   | 235      | 6.17‡096           | 295  | 6.656931   |
| 56<br>57 | 3.825862   | 116   | 4.876999   | 176         | 5,604079   | 236      | 6.179747           | 296  | 6.664444   |
| 57       | 3.848501   | 117   | 4.890973   | 177         | 5.614678   | 237      | 6.188463           | 297  | 6.671940   |
| 41       | 3.870877   | 118   | 4.904868   | 178         | 5.625226   | 238      | 6.197155           | 298  | 6.679421   |
| 1 59     | 3.899996   | 119   | 4.918685   | 179         | 5.635741   | 289      | 6.205822           | 299  | 6.686885   |
| 60       | 9.914867   | 120   | 4.932424   | 180         | 5.646216   | 240      | 6.214465           | 800  | 6.694331   |
|          |            |       |            |             |            |          |                    |      | 29         |

TABLE LX.

AMOUNT OF £.1 AT COMPOUND INTEREST.

| Years.     | 3 per Cent.        | Si per Cent.       | 4 per Cent.          | 4½ per Cent.         | 5 per Cent.                                  | 6 per Cent.          |
|------------|--------------------|--------------------|----------------------|----------------------|--|----------------------|
| 1          | 1.03000            | 1.03500            | 1.04000              | 1.04500              | 1.05000                                      | 1.06000              |
| 2          | 1.06090            | 1.07122            | 1.08160              | 1.09202              | 1.10250                                      | . 1.12360            |
| 3          | 1.09273            | 1.10872            | 1.12486              | 1.14117              | 1.15762                                      | 1.19102              |
| `4         | 1.12551            | 1.14752            | 1.16986              | 1.19252              | 1.21551                                      | 1.26248              |
| 5          | 1.15927            | 1.18769            | 1.21665              | 1.24618              | 1.27628                                      | 1.33823              |
| 6          | 1.19405            | 1.22925            | 1.26532              | 1.30226              | 1.34010                                      | 1.41852              |
| 7          | 1.22987            | 1.27228            | 1.31593              | 1.36086              | 1.40710                                      | 1.50363              |
| 8          | 1.26677            | 1.31681            | 1.36857              | 1.42210              | 1.47745                                      | 1.59385              |
| 9          | 1 30477            | 1.36290            | 1.42321              | 1.48609              | 1.55133                                      | 1.68948              |
| 10         | 1.34392            | 1.41060            | 1.48024              | 1 55297              | 1.62889                                      | 1.79085              |
| 11         | 1.38423            | 1.45997            | 1.53945              | 1.62285              | 1.71034                                      | 1.89890              |
| 12<br>13   | 1.42576            | 1.51107            | 1.60103              | 1.69588              | 1.79586                                      | 2.01220              |
| 14         | 1.46853            | 1.56396            | 1.66507              | 1.77220              | 1.88565                                      | 2.13293              |
| 15         | 1.51259            | 1.61869            | 1.73168              | 1.85194              | 1.97993                                      | 2.26090              |
| 16         | 1.55797            | 1.67535            | 1.80094              | 1 93528              | 2.07893                                      | 2.39656              |
| 17         | 1.65285            | 1.75399<br>1.79468 | 1.87298<br>1.94790   | 2.02237<br>2.11338   | 2.18287<br>2.29202                           | 2.54025<br>2.69277   |
| 18         | 1.70243            | 1.85749            | 2.02582              | 2.20848              | 2.40662                                      | 2.85434              |
| 19         | 1.75351            | 1.92250            | 2.10685              | 2.30786              | 2.52695                                      | 3.02560              |
| 20         | 1.80611            | 1.98979            | 2.19112              | 2.41171              | 2.65330                                      | 3.20713              |
| 21         | 1.80629            | 2.05943            | 2.27877              | 2.52024              | 2.78596                                      | 3.39956              |
| 22         | 1.91610            | 2.13151            | 2.36992              | 2.63365              | 2.92526                                      | 3.60354              |
| 23         | 1.97359            | 2.20611            | 2.46472              | 2.75217              | 3.07152                                      | 3.81975              |
| 24         | 2.03279            | 2.28333            | 2.56330              | 2.87601              | 3.22510                                      | 4.04893              |
| 25         | 2.09378            | 2.36324            | 2.66584              | 3.00543              | 3.38635                                      | 4.29187              |
| 26<br>27   | 2.15659            | 2.44596            | 2.77247              | 3.14068              | 3.55567                                      | 4.54938              |
| 28         | 2.22129            | 2.53157            | 2.88337              | 3.28201              | 3.73346                                      | 4.82235              |
| 26<br>29   | 2.28793<br>2.35657 | 2.62017            | 2.99870              | 3.42970<br>3.58404   | 3.92013                                      | 5.11169              |
| 30         | 2.42726            | 2.71188<br>2.80679 | 3.11865<br>3.24340   | 3.74532              | 4.11614<br>4.32194                           | 5.41839<br>5.74349   |
|            |                    | 2.60019            | 3.21310              | J. / 1332            | 1.02131                                      | <u></u> ]            |
| 31         | 2.50008            | 2.90503            | 3.37313              | 3.91386              | 4.53804                                      | 6.08810              |
| 32         | 2.57508            | 3.00671            | 3.50806              | 4.08998              | 4.76494                                      | 6.45339              |
| 33         | 2.65233            | 3.11194            | 3.64838              | 4.27403              | 5.00319                                      | 6.84059              |
| 34         | 2.73190            | 3.22086            | 3.79432              | 4.46636              | 5.25335                                      | 7.25102              |
| 35         | 2.81386            | 3.33359            | 3.94609              | 4.66735              | 5.51601                                      | 7.68609              |
| 36         | 2.89828            | 3.45027            | 4.10393              | 4.87738              | 5.79182                                      | 8.14725              |
| 37<br>38   | 2.98523            | 3.57102            | 4.26809              | 5.09686              | 6.08141                                      | 8.63609              |
| 39         | 3.07478            | 3.69601            | 4.43881              | 5.32622              | G.38548                                      | 9.15425              |
| 40         | 3.16703<br>3.26204 | 3.82537<br>3.95926 | 4.61637<br>4.80102   | 5.56590              | 6.7047 <i>5</i><br>7.03999                   | 9.70351<br>10.28572  |
|            |                    |                    |                      | 5.81636              |  |                      |
| 41         | 3.35990            | 4.09783            | 4.99806              | 6.07810              | 7.39199                                      | 10.90286             |
| 42<br>43   | 9.46070            | 4.24126            | 5.19278              | 6.35161              | 7.76159                                      | 11.55703             |
| 44         | 3.56452            | 4.38970            | 5,40050              | 6.63744              | 8.14967                                      | 12.25045             |
| 45         | 3.67145<br>3.78160 | 4.54934<br>4.70236 | 5.61651<br>5.84118   | 6.93612<br>7.24825   | 8. <i>55</i> 71 <i>5</i><br>8.98 <i>5</i> 01 | 12.98548<br>13.76461 |
| 46         | 3.89504            | 4.86694            | 6.07482              | 7.24625              | 9.43426                                      | 14.59049             |
| 47         | 4.01189            | 5.03728            | 6.31782              | 7.91527              | 9.90597                                      | 15.46599             |
| 48         | 4.13225            | 5.21959            | 6.57053              | 8.27146              | 10.40127                                     | 16.39387             |
| 49         | 4.25622            | 5.39606            | 6.83335              | 8.64367              | 10.92139                                     | 17.37750             |
| 50         | 4.38391            | 5.58493            | 7 10668              | 9.03264              | 11.46746                                     | 18.42015             |
| 51         | 4.51542            | 5.78040            | 7.39095              | 9.43910              | 12.04077                                     | 19.52536             |
| 52         | 4.65089            | 5.98271            | 7.68659              | 9.86386              | 12.64281                                     | 20.69688             |
| 58         | 4.79041            | 6.19211            | 7.99405              | 10.30774             | 13.27495                                     | 21.93870             |
| 54         | 4.93412            | 6.40888            | 8.91381              | 10.77159             | 13.93870                                     | 23.25502             |
| 55         | 5.08215            | 6.63314            | 8.64637              | 11.25631             | 14.63568                                     | 24.65032             |
| <b>5</b> 6 | 5.23461            | 6.86530            | 8.99222              | 11.76284             | 15.36741                                     | 26.12934             |
| 57<br>58   | 5.39165            | 7.10559            | 9.35191              | 12.29217             | \$6.13578                                    | 27.69710             |
| 58<br>59   | 5.55340<br>5.79000 | 7.35428            | 9.72599              | 12.84532             | 16.94257                                     | 29.358 <b>93</b>     |
| 60         | 5.72000<br>5.89160 | 7.61168<br>7.87809 | 10.11503<br>10.51963 | 13.42336<br>14.02741 | 17.78970<br>18.67919                         | 81.12046<br>32.98769 |
| 100        | 0.03100            | 7.07003            | 10.04503             | 14.02141             | 40.01313                                     | Ja.,70109            |
|            |                    |                    | •                    |                      |  | ì                    |

TABLE LX1.

PRESENT VALUE OF (1, AT COMPOUND INTEREST.

| Years.   | 3 per Cent. | 3½ per Cent.    | 4 per Cent. | 4½ per Cent.     | 5 per Cent,      | 6 per Cent      |
|----------|-------------|-----------------|-------------|------------------|------------------|-----------------|
| 1        | .970874     | .966184         | .961588     | .956938          | ,952381          | .943396         |
| 2        | .942596     | .938511         | .924556     | .915730          | .907029          | .889996         |
| 3        | .915142     | .901943         | .838996     | .876297          | .863858          | .839619         |
| 4        | .888437     | .871442         | .854804     | .838561          | .822702          | .792094         |
| 5        | .862609     | .841973         | .821927     | .802451          | .783526          | .747258         |
| 6        | .837484     | 813501          | .790315     | .767896          | .746215          | .704961         |
| 7.       | .813092     | ,785991         | .759918     | .734828          | .710681          | .665057         |
| 8        | .789409     | .759412         | .730690     | .703185          | .676839          | .627412         |
| 9        | .766417     | .739781         | .702587     | .672904          | .644609          | .591898         |
| 10       | .744094     | .708919         | .675564     | .643928          | .613913          | .558395         |
| <u> </u> |             |                 |             |                  |                  |                 |
| 11 -     | .722421     | .684945         | .649581     | .616199          | .584679          | .526788         |
| 12       | .701580     | .661783         | .624597     | . 589664         | .556837          | .496969         |
| 13       | .680951     | .693404         | .600574     | .564272          | .530321          | .468839         |
| 14       | .661118     | .617782         | .57747,5    | .539973          | .505068          | .442301         |
| 15       | .641862     | .596191         | .555265     | .561720          | .481017          | .41726 <i>5</i> |
| 16       | .623167     | .576706         | .533908     | .494469          | .458112          | .393646         |
| 17       | .605016     | .557204         | .513373     | .473176          | .436297          | .371364         |
| 18       | .587895     | .538361         | .493628     | .452800          | .415521          | .350344         |
| 19       | .570286     | .520156         | .474642     | .483302          | .395734          | .890513         |
| 20       | .558676     | .502566         | .456387     | .418643          | .376889          | .311805         |
| 21       | .537549     | .483571         | .438834     | .369787          | .358942          | .294155         |
| 22       | .521893     | .469151         | .421953     | .379701          | .341850          | .277505         |
| 23       | .506692     | .453286         | .405726     | 363350           | .325571          | .261797         |
| 24       | .491934     | .437957         | .390121     | .347703          | .310068          | .246979         |
| 25       | .477606     | .428147         | .975117     | .332731          | .295303          | .232999         |
| 26       | .463695     | .408838         | .360689     | .318402          | .281241          | .219810         |
| 27       | .450189     | .395012         | .846817     | .304691          | .267848          | 207368          |
| 28       | 437077      | .381654         | .353477     | .291571          | 255094           | 195630          |
| 29       | 424346      | .368748         | .320651     | .279015          | .242946          | .184557         |
| 30       | .411987     | .356278         | .308819     | .267000          | .231377          | .174110         |
| 31       | .399987     | .344230         | .296460     | .255502          | .220359          | .164255         |
| 32       | .388337     | .332590         | 285058      | .244500          | .20339           | .154957         |
| 33       | .377026     | .321343         | .274094     | .233971          | .199873          | .146186         |
| 34.      | .366445     | .321343         | .263552     | ,226896          | . 190855         | .137912         |
| 35       | .355383     | 299977          | .253415     | .214254          | .181290          | .130105         |
| 36       | .345032     | 289833          | .243669     | .205028          | .172657          | .122741         |
| 57       | .334983     | 280032          | .294297     | .196199          | .164436          | .115793         |
| 58       | .325226     | .270562         | 225285      | .1877 <i>5</i> 0 | .156605          | .109239         |
| 39       | .315754     | .261413         | .216621     | .179665          | .149148          | .103056         |
| 40       | .306557     | 232572          | .208289     | .171929          | .142046          | .097222         |
| <u> </u> |             |                 |             | <u></u>          |                  |                 |
| 41       | .297628     | .244031         | .200278     | .164525          | .185282          | .091719         |
| 42       | , 288959    | .235779         | .192575     | .157440          | .128840          | .086527         |
| 49       | .280548     | .227806         | .185168     | .150661          | .122704          | .081630         |
| 44       | .272372     | .220102         | . 178046    | .144173          | .116861          | .077009         |
| 45       | 264439      | ,21 <b>2659</b> | .171198     | .137964          | .111297          | .072650         |
| 46       | .256737     | .205468         | .164614     | .132023          | .105997          | .068538         |
| 47       | .249259     | .198520         | .158283     | . 126338         | .100949          | .064658         |
| 48       | .241999     | 191806          | .152195     | .120898          | .096142          | ,060998         |
| 49       | .234950     | .185320         | .146341     | .115692 •        | ,091 <i>5</i> 64 | .057546         |
| 50       | .228107     | .179053         | .140713     | .110710          | .087204          | .054288         |
| 51       | .221463     | ,172998         | .135301     | . 105942         | .088051          | .051215         |
| 52       | .215013     | .167148         | . 180097    | .101380          | . 079096         | .048316         |
| 58       | .208750     | .161496         | .125093     | .097014          | .075390          | .045582         |
| 54       | .202670     | .1560a5         | .120282     | .092837          | .071743          | .043001         |
| 55       | .196767     | .150758         | .115656     | .088859          | .068326          | L040567         |
| 56       | . 191036.   | . 145660        | .111208     | .085018          | .065073          | .038271         |
| 57       | 185472      | 140794          | .106930     | .081353          | .061974          | .036105         |
| 58       | .180070     | .135975         | .102817     | .077849          | .059023          | .034061         |
| 59       | .174825     | .191977         | .098963     | .074497          | .056212          | .032183         |
| 60 ·     | .169733     | .126994         | .095060     | .071289          | 1058586          | .030314         |
|          | <del></del> | <del></del> 1   | <del></del> | <del></del>      |                  | <del></del>     |

TABLE LXII.

AMOUNT OF AN ANNUITY OF £.1, AT COMPOUND INTEREST.

| 1   1,00000   1,00000   1,00000   1,00000   1,00000   2,04500   2,04500   2,0500   2,06000   3,06900   3,10693   3,19260   3,18360   4   4,18563   4,21494   4,24646   4,27819   4,31013   4,37462   5,50914   5,69217   5,41632   5,47971   5,9263   5,63709   6   6,46841   6,55015   6,63297   6,71689   6,80191   6,97552   7,763246   7,77941   7,88829   8,01915   8,14801   8,89344   9,05169   9,21423   9,38001   9,54911   9,89747   10,0591   10,5852   10,58279   10,80211   11,06256   11,73139   12,00611   12,28821   12,57789   13,18079   11,46388   11,73139   12,00611   12,28821   12,57789   13,18079   14,19203   14,60196   15,02390   15,46103   15,91713   16,86934   17,15991   17,71298   18,88144   14,19203   14,60196   15,02390   15,46103   15,91713   16,86934   17,15991   17,71298   18,88144   14,19205   14,60196   15,02390   15,46103   15,91713   16,86934   17,15991   17,71298   18,88144   14,19205   14,60196   15,02390   15,46103   15,91713   16,86934   17,15991   17,71298   18,88144   14,19205   14,60196   15,02390   15,46103   15,91713   16,86934   17,15991   17,71298   18,88144   14,19205   14,60196   15,02390   15,46103   15,91713   16,86934   17,15991   17,71298   18,88144   14,19205   14,60196   15,02390   15,46103   15,91713   16,86934   17,15991   17,71298   18,88144   14,19205   14,60196   15,02399   20,78403   21,57866   22,27597   22,70502   23,66751   24,74171   22,84037   22,12288   23,45288   24,46941   36,61729   29,03556   30,35900   33,75999   32,11687   26,6653   39,97808   41,49479   36,6653   39,97808   41,49479   36,6653   39,97808   41,49479   36,66653   39,97808   41,49479   36,6653   39,97808   41,49479   36,6653   39,97808   41,49479   36,6653   49,97808   41,49479   36,6653   49,97808   41,49479   36,6653   49,97808   41,49479   36,6653   49,97808   41,49479   36,6653   49,97808   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   41,49479   | Years. | 3 per Cent. | Si per Cent. | 4 per Cent. | 4½ per Cent. | 5 per Cent. | 6 per Cent.       |
|--|--------|-------------|--------------|-------------|--------------|-------------|-------------------|
| 2  |        | 1.00000     |              | <del></del> |              |             |                   |
| 3         3.09000         \$ 3.10693         3.12160         3.13703         4.31913         4.374619           5         5.30914         5.36947         5.41632         5.47971         5.5263         6.60297         6.60297         6.71689         6.80191         6.97592         6.80191         6.97592         6.80191         6.97592         6.80191         6.97592         8.14201         8.39384         8.39384         8.39384         8.39384         8.39384         8.39384         8.39384         9.3110         8.39384         8.39384         9.3111         9.38747         9.21423         9.38001         9.54911         9.38747         9.38748         9.39344         9.39344         9.39344         9.39344         9.39344         9.39484         9.39364         9.38748         9.38748         9.38748         9.38748         9.38748         9.38748         9.38748         9.38748         9.38748         9.38748         9.38748         9.38748         9.38748   |        |             |              |             |              |             |                   |
| 4         4.1886S         4.21494         4.24646         4.27819         5.59593         5.30214         6.36207         6.62927         6.71689         6.80191         6.97532         7.76246         6.55015         6.62927         6.71689         8.14201         8.93284         8.01015         8.14201         8.93284         8.01015         8.14201         8.93284         8.01015         8.14201         8.93284         8.01015         8.14201         8.93284         9.21423         9.38001         9.54911         9.80747         9.8001         9.54911         9.80747         9.8001         9.54911         9.80747         9.8001         9.54911         9.80747         9.8001         11.06552         11.40132         11.06552         11.40132         11.06552         11.40132         11.40132         11.402679         11.40132   |        |             |              |             |              |             |                   |
| 5         5. 3.9914         5. 3.6247         5. 41632         5. 47971         5. 59563         6. 63191         6. 75512           7         7. 66246         7. 77941         7. 88829         8. 10195         6. 80191         6. 77532           8         8. 89234         9. 05169         9. 21423         9. 8001         9. 54911         9. 89747           9         10. 1.5911         10. 36850         10. 58279         10. 60211         11. 02656         11. 49132           10         11. 280780         13. 48633         13. 48633         13. 48131         14. 49079         14. 91932           14         1. 19033         14. 60196         15. 05280         15. 46103         15. 91713         16. 8694           13         1. 5. 61779         16. 11908         16. 62864         17. 1591         17. 71298         18. 88214           14         17. 08632         17. 67699         18. 29191         18. 58311         19. 59863         21. 01507           15         18. 58811         19. 29568         20. 270502         23. 69731         24. 74171         25. 64541         25. 64541         25. 64541         25. 64541         25. 64541         25. 64541         25. 64541         25. 64541         25. 64541         25. 64541<  |        |             |              |             |              |             |                   |
| 6  |        |             |              |             |              |             |                   |
| 7         7.66246         7.77941         7.88829         8.01915         8.14901         8.39384           9         10.15911         10.36850         10.58279         10.80211         11.02656         11.49132           10         11.46388         11.73139         12.00611         12.88211         19.57789         13.18079           11         12.80780         13.14199         13.46635         13.4418         14.90079         14.97164           13         15.61779         16.611303         16.63684         17.1599         17.71298         18.8214           14         17.06632         17.67699         18.29101         18.93211         19.59863         21.01507           15         18.5981         19.29568         20.97103         21.82453         22.71934         23.65749         22.67526           16         20.15688         20.97103         21.82453         22.71934         23.65749         25.67233           17         21.76159         22.70502         23.66731         27.67123         23.03393         23.7556         23.75567         23.7557           20         26.87057         28.27968         29.9780         35.0338         33.33930         33.75999         27.6123         30.3   |        | H           |              |             |              |             |                   |
| 8  |        |             |              |             |              |             |                   |
| 10   1.5811   10   3.6850   10   5.8279   10   10   80211   11   3.0256   11   4.9182  | 8      |             |              |             |              |             |                   |
| 11   | 9      |             |              |             |              |             |                   |
| 19 14.19203 14.60166 15.02580 15.46403 15.91713 16.86904 113 15.61779 16.11303 16.62684 17.15991 17.71298 18.8814 117.08632 17.67699 18.29191 18.93211 19.59863 21.01507 15 18.59891 19.29568 20.02359 20.78405 21.57856 23.27597 16 20.15688 20.97103 21.89453 22.71994 23.66749 25.67293 17 21.76159 22.70502 23.69751 24.74171 25.84037 28.21288 18 23.41443 24.49969 25.64541 26.86508 28.13238 30.9565 19 25.11687 26.35718 27.67129 29.00356 30.39300 33.75999 26.87037 28.27968 29.77808 31.37142 33.06595 36.78559 29.00356 30.39300 33.75999 26.87037 28.27968 29.77808 31.37142 33.06595 36.78559 39.93273 33.45288 34.46041 36.61793 38.39703 41.43047 46.99583 24.49647 36.66653 39.03260 41.68920 44.50200 50.81558 25 36.45926 38.94986 41.64591 44.56521 47.72710 54.86451 26.85452 49.29029 46.29005 49.96758 53.9938 36.55594 41.31310 44.31174 47.57064 51.11345 59.15638 27 40.70968 43.75906 49.96758 53.99389 53.5504 41.391310 52.2965 57.42303 62.32271 75.63980 30.47.67422 51.62268 50.08494 61.00707 66.43885 79.05819 35.50784 60.34121 66.20953 72.73623 89.06377 97.94816 63.45315 69.37931 77.70306 51.1845 79.05819 35.50784 60.34121 66.20953 72.73623 89.06377 97.94816 59.45630 47.75742 77.79088 63.45315 69.35791 77.03096 50.45936 66.67401 77.56522 81.49662 90.39031 111.43478 96.66639 95.08552 60.46308 66.67401 77.65226 85.00494 61.00707 66.43885 79.08819 35.07784 60.34121 66.20953 72.73623 89.06377 97.94816 69.37547 77.02889 85.97034 96.18900 110.12883 11.49479 19.19479 15.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.48769 112.93889 11.50.1939 11.50869 111.4875 19.50869 111.48769 112.9389 11.50869 111.48769 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50899 11.5 | 10     | 11.46388    | 11.78139     | 12.00611    | 12.28821     | 12.57789    | 13.18079          |
| 19 14.19203 14.60166 15.02580 15.46403 15.91713 16.86904 113 15.61779 16.11303 16.62684 17.15991 17.71298 18.8814 117.08632 17.67699 18.29191 18.93211 19.59863 21.01507 15 18.59891 19.29568 20.02359 20.78405 21.57856 23.27597 16 20.15688 20.97103 21.89453 22.71994 23.66749 25.67293 17 21.76159 22.70502 23.69751 24.74171 25.84037 28.21288 18 23.41443 24.49969 25.64541 26.86508 28.13238 30.9565 19 25.11687 26.35718 27.67129 29.00356 30.39300 33.75999 26.87037 28.27968 29.77808 31.37142 33.06595 36.78559 29.00356 30.39300 33.75999 26.87037 28.27968 29.77808 31.37142 33.06595 36.78559 39.93273 33.45288 34.46041 36.61793 38.39703 41.43047 46.99583 24.49647 36.66653 39.03260 41.68920 44.50200 50.81558 25 36.45926 38.94986 41.64591 44.56521 47.72710 54.86451 26.85452 49.29029 46.29005 49.96758 53.9938 36.55594 41.31310 44.31174 47.57064 51.11345 59.15638 27 40.70968 43.75906 49.96758 53.99389 53.5504 41.391310 52.2965 57.42303 62.32271 75.63980 30.47.67422 51.62268 50.08494 61.00707 66.43885 79.05819 35.50784 60.34121 66.20953 72.73623 89.06377 97.94816 63.45315 69.37931 77.70306 51.1845 79.05819 35.50784 60.34121 66.20953 72.73623 89.06377 97.94816 59.45630 47.75742 77.79088 63.45315 69.35791 77.03096 50.45936 66.67401 77.56522 81.49662 90.39031 111.43478 96.66639 95.08552 60.46308 66.67401 77.65226 85.00494 61.00707 66.43885 79.08819 35.07784 60.34121 66.20953 72.73623 89.06377 97.94816 69.37547 77.02889 85.97034 96.18900 110.12883 11.49479 19.19479 15.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.4875 19.50869 111.48769 112.93889 11.50.1939 11.50869 111.4875 19.50869 111.48769 112.9389 11.50869 111.48769 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50869 112.9389 11.50899 11.5 | 71     | 12.80780    | 13,14199     | 13.48635    | 13.84118     | 14.20679    | 14.97164          |
| 18   |        |             |              |             | 1 .          |             |                   |
| 14         17.06692         17.67699         18.99191         19.59863         20.07597         21.78405         21.57856         20.27597           16         20.15688         20.97103         21.82453         22.71934         23.65749         25.67253         17         21.76159         22.70502         23.69751         24.74171         25.84037         28.21288         29.2750502         23.65749         25.67573         28.21288         29.07565         29.06356         30.39000         33.75999         25.61541         26.8508         38.13238         30.90565         30.39000         33.75999         25.67679         28.27988         29.075808         31.97142         33.06595         36.78559           21         28.67649         30.26947         31.96920         33.78314         35.71925         39.99273           22         39.55678         32.38890         34.24797         36.30338         38.50591         43.339299           23         34.5288         34.40041         36.61789         38.93703         41.49047         46.99583           24         34.42647         36.66653         39.03260         41.68920         44.50900         50.81558           25         36.45296         43.75906         47.06421         47.75   |        |             |              |             |              |             |                   |
| 15         18.59891         19.29568         20.078405         21.76156         23.27597           16         20.15688         20.97103         21.84453         22.71934         23.6749         28.21288           17         21.76159         22.70502         23.69751         24.74171         25.84037         28.21288           18         23.41443         24.49969         25.61541         26.8508         28.13288         30.93565           20         25.11667         26.35718         27.67123         29.00356         30.35900         33.75999           20         26.67649         30.26947         31.96920         33.78314         35.71925         39.92273           21         28.67649         30.26947         31.96920         33.78314         35.71925         39.9273           22         30.53678         32.32890         34.24797         36.3038         35.57521         43.39929           23         32.45288         34.46041         36.61729         38.93703         41.49047         46.99583           24         34.42647         36.66653         39.03260         41.68920         44.50200         50.81558           27         40.70963         43.75964         44.9147         49.96   |        |             |              |             |              |             |                   |
| 16         20.15688         20.97103         21.89453         22.71934         23.67749         25.67253           17         21.76159         22.70502         23.69751         24.74171         25.84037         28.21288         30.93565           19         25.11687         26.35718         27.67123         29.06356         30.39900         33.75999           20         26.87057         28.27968         29.77808         31.37142         33.06395         33.75999           21         28.67649         30.26947         31.96920         33.78814         35.71925         39.99273           22         30.58676         32.32890         34.24797         36.30338         38.55521         43.99299           23         32.45288         34.46041         36.61789         38.93703         41.49047         36.6953           24         34.49847         36.66553         39.03260         41.68920         44.56521         47.72710         54.86451           25         36.49926         38.94986         41.64591         44.56521         47.72710         54.86451           26         38.55004         41.31310         44.31174         57.6764         51.11345         51.66913         63.70577           <   | 15     |             |              |             |              |             |                   |
| 17         21.76159         22.70502         23.66751         24.74171         25.84037         28.21288           18         23.4143         24.49999         25.61541         26.85508         29.13283         30.93565         30.38900         33.75999           20         25.11687         26.35718         27.67123         29.06356         30.38900         33.75999           20         26.67649         30.26947         31.96920         33.78314         35.71925         39.9273           22         30.53678         32.32890         34.24797         36.3038         88.50591         43.39299           23         32.45288         34.46041         36.61789         38.93703         41.49047         46.99583           24         34.49247         36.66653         39.03260         41.68920         44.50200         50.81558           25         36.45926         38.94986         41.64591         44.56521         47.72710         54.86451           27         40.70863         43.75906         47.08421         57.71192         54.66913         63.70577           28         42.90092         46.29063         49.96758         53.99338         58.40258         68.52811           29         45.2   | 16     |             |              |             |              | 23.65749    | 25.67253          |
| 18   | 17 -   |             |              |             |              |             | 28.21288          |
| 25.11687   26.35718   27.67193   29.06356   30.59500   33.75999   26.87037   28.27968   29.77808   31.37142   33.06595   36.78559   39.59678   32.32890   34.24797   36.30338   38.50521   43.39239   34.24797   36.30338   38.50521   43.39239   34.42647   36.66653   39.03260   41.68920   44.59200   50.81558   25   36.45926   38.94986   41.64591   44.56521   47.72710   54.86451   26.5304   41.31310   44.31174   47.57064   51.11345   59.15638   27   40.70963   43.75906   47.6421   50.71132   54.66913   53.70577   28   42.90092   46.29063   49.96738   53.99388   58.40258   68.2811   29   45.21885   48.91080   52.96699   57.42903   62.39271   78.63980   37.57542   51.62268   56.08494   61.00707   66.43885   79.05819   39.550774   60.34121   66.20953   72.75623   80.66377   79.53819   57.79018   63.45315   69.85791   77.03096   85.06896   104.18375   35.6046481   69.15946   39.32031   31.43478   39.55594   70.00760   77.59881   86.16397   95.83892   39.83911   39.57544   70.00760   77.59881   86.16397   95.83892   119.12087   37.6617422   37.45787   81.70225   101.46442   114.09502   145.03846   42.82029   92.60737   104.81960   119.84669   127.83876   147.92618   157.50386   16.3979   95.83892   119.12087   175.60386   104.4803   126.87057   146.09821   127.83812   | 18     | 23.41443    | 24.49969     |             |              | 28.13238    | 30.90565          |
| 20         26.87037         28.27968         29.77808         31.37142         33.06395         36 78559           21         28.67649         30.26947         31.96920         33.78314         35.71925         39.99273           22         30.53678         32.32890         34.24797         36.30338         38.50521         43.39249           23         32.45288         34.46041         36.61789         38.93703         41.49047         46.99583           24         34.42647         36.66653         39.03260         41.68920         44.50200         50.81558           25         36.45926         38.94986         41.64591         44.56521         47.7210         54.86451           26         38.5304         41.31310         44.31174         47.57064         51.11345         59.15638           27         49.70963         43.75906         47.08421         50.71132         54.66913         56.7537           28         42.90092         46.29063         49.96729         57.42903         62.32271         73.63980           30         47.57342         51.63268         56.08494         61.00707         66.43885         79.05819           31         50.00268         54.42947         59.3   |        |             |              |             |              | 30.53900    | 53.75 <b>99</b> 9 |
| 22         39.53678         32.32890         34.24797         36.90338         38.50521         43.99299           23         32.45288         34.46641         36.61789         38.93703         41.43047         46.99583           24         34.42647         36.66653         99.03260         41.68920         44.90200         50.81588           25         36.45926         38.94986         41.64591         44.56521         47.72710         54.86451           26         38.55304         41.31310         44.31174         47.57064         51.11345         59.15638           27         40.70963         43.75906         47.06421         50.71192         54.66913         63.70577           28         42.93092         46.29063         49.96758         53.99338         58.40258         68.52811           29         45.21885         48.91080         52.96629         57.42903         62.32271         73.63980           30         47.57542         51.62268         56.08494         61.00707         66.4385         79.05819           31         50.00268         54.42947         59.32833         64.75239         70.76079         84.80168           32         55.07784         60.34121         66   | 20     | 26.87037    | 28.27968     | 29.77808    | 31.37142     | 33.06595    | 36 78 <i>55</i> 9 |
| 22         39.53678         32.32890         34.24797         36.90338         38.50521         43.99299           23         32.45288         34.46641         36.61789         38.93703         41.43047         46.99583           24         34.42647         36.66653         99.03260         41.68920         44.90200         50.81588           25         36.45926         38.94986         41.64591         44.56521         47.72710         54.86451           26         38.55304         41.31310         44.31174         47.57064         51.11345         59.15638           27         40.70963         43.75906         47.06421         50.71192         54.66913         63.70577           28         42.93092         46.29063         49.96758         53.99338         58.40258         68.52811           29         45.21885         48.91080         52.96629         57.42903         62.32271         73.63980           30         47.57542         51.62268         56.08494         61.00707         66.4385         79.05819           31         50.00268         54.42947         59.32833         64.75239         70.76079         84.80168           32         55.07784         60.34121         66   | 21     | 28.67649    | 30.26947     | 31.96920    | 33.78314     | 35.71925    | 39.99273          |
| 23         39.45288         34.46041         36.61789         38.93703         41.43047         46.99583           24         34.42647         36.66653         39.03260         41.68920         44.50200         50.81558           25         36.45926         38.94986         41.64591         44.56521         47.72710         54.86451           26         38.55304         41.31310         44.31174         47.57064         51.11345         59.15638           27         49.70963         43.75906         47.08421         50.71132         54.66913         63.70577           28         42.90092         46.29003         49.96738         53.99333         58.40238         68.22811           29         45.21885         48.91080         52.96629         57.42903         62.32271         73.63980           30         47.57542         51.62268         56.08494         61.00707         66.43885         79.05819           31         50.00268         54.42947         59.32833         64.75239         70.76079         84.80168           32         52.50276         57.33450         62.70147         68.66634         73.29883         90.6877         79.43416           34         57.79018         63   |        |             |              |             |              |             |                   |
| 24         34.49647         36.66653         39.03260         41.68920         44.50200         50.81558           25         36.45926         38.94986         41.64591         44.56521         47.72710         54.86431           26         38.55504         41.31174         47.57064         51.11345         59.15638           27         40.70963         43.75906         47.08421         50.71132         54.66913         69.70577           28         42.90092         46.29063         49.96758         53.9933         58.40258         68.52811           29         45.21885         48.91080         52.96629         57.42906         62.32271         75.63980           30         47.57542         51.62268         56.08494         61.00707         66.43885         79.05819           31         50.00268         54.42947         59.32833         64.73299         70.76079         84.80168           32         52.50276         57.33450         62.70147         68.66624         75.29883         90.88978           33         55.07784         60.34121         66.20953         72.75623         80.06377         97.34816           34         57.79018         63.45315         69.85791         77   |        |             |              |             |              |             |                   |
| 26   | 24     |             |              |             |              | 44.50200    | 50.81558          |
| 27         40.70963         43.75966         47.08421         50.71132         54.66913         63.70577           28         42.93092         46.29063         49.96758         53.99338         58.40256         68.52811           30         47.57542         51.62268         56.08494         61.00707         66.43885         79.05819           31         50.00268         54.42947         59.32833         64.75239         70.76079         84.80168           32         52.50276         57.33450         62.70147         68.66624         75.29883         90.88978           33         55.07784         60.34121         66.20953         72.75623         80.06377         97.34816           34         57.79018         63.45315         69.85791         77.09026         85.06696         104.18875           35         60.46208         66.67401         73.65232         81.49662         99.32031         111.43478           36         63.27594         70.00760         77.59831         86.16397         95.83632         119.12087           37         26.15945         77.02889         85.97034         96.13890         107.7955         135.90421           39         72.29425         80.72491         <   | 25     | 36.45926    | 38.94986     | 41.64591    | 44.56521     | 47.72710    | 54.86451          |
| 28         42.93092         46.29063         49.96758         53.99338         58.40258         68.52811           29         45.21885         48.91080         52.96629         57.42303         62.32271         73.63980           30         47.57542         51.6268         56.08494         61.00707         66.48885         79.05819           31         50.00268         54.42947         59.32833         61.75239         70.76079         84.80168           32         52.50276         57.33450         62.70147         68.66624         75.29883         90.88778           33         55.07784         60.34121         66.20953         72.75623         80.06377         97.34316           34         57.79018         63.45315         69.85791         77.09026         85.06696         104.18875           35         60.46908         66.7401         73.65232         81.49662         99.39031         111.43478           36         63.27594         70.00760         77.59831         86.16397         95.83632         119.12087           37         66.17422         73.45787         81.70225         91.04134         101.62814         127.26812           39         72.2425         80.7343  | 26     | 38.55304    | 41.31310     | 44.31174    | 47.57064     | 51.11845    | 59.15638          |
| 29         45.21865         48.91080         52.966/29         57.42303         62.32271         73.63980           30         47.57542         51.62268         56.08494         61.00707         66.43885         79.05819           31         50.00268         54.42947         59.32833         64.75239         70.76079         84.80168           32         52.50276         57.33450         62.70147         68.66694         75.29883         90.88978           33         55.07784         60.34121         66.20953         72.75623         80.06377         97.34316           34         57.79018         63.45315         69.85791         77.03096         85.06696         104.18375           35         60.46208         66.67401         73.65292         81.49662         90.32031         111.43478           36         63.27594         70.00760         77.59831         86.16397         95.83032         119.12087           37         66.17422         73.45787         81.70225         91.04134         101.62814         127.26812           39         72.29425         80.72491         90.40915         101.46442         114.09502         145.05846           40         75.40126         84.55028  | 27     | 40.70963    | 43.75906     | 47.08421    | 50.71132     | 54.66913    | 63.70577          |
| 30         47.57542         51.62268         56.08494         61.00707         66.43885         79.05819           31         50.00268         54.42947         59.32833         64.75239         70.76079         84.80168           32         52.50276         57.33450         62.70147         68.66624         75.29883         90.88978           33         55.07784         60.34121         66.20953         72.75023         80.06377         97.34316           34         57.79018         63.45315         69.85791         77.03026         85.06696         104.18375           35         60.46208         66.67401         73.65292         81.49662         99.32031         111.43478           36         63.27594         70.00760         77.59831         86.16397         95.83632         119.12087           37         66.17422         73.45787         81.70225         91.04134         101.62814         127.26812           38         69.15945         77.02889         85.97034         96.13890         107.7955         195.90421           39         72.29425         80.72491         90.40915         101.46442         114.09502         145.05846           40         75.40126         84.55028  |        |             | 46.29063     | 49.96758    | 53.99338     |             |                   |
| 31         50.00268         54.42947         59.32833         64.75239         70.76079         84.80168           32         52.50276         57.33450         62.70147         68.66624         75.29883         90.88978           33         55.07784         60.34121         66.20953         72.75623         89.06377         97.34316           34         57.79018         63.45315         69.85791         77.03036         85.06696         104.18375           35         60.46208         66.67401         73.65292         81.49662         90.32031         111.43478           36         63.27594         70.00760         77.59831         86.16397         95.83032         119.12067           37         66.17422         73.45787         81.70225         91.04134         101.62814         127.26812           38         69.15945         77.02889         85.97034         96.13890         107.7955         135.90421           39         72.3425         80.72491         90.40915         101.46442         114.09502         145.05846           40         75.40126         84.55028         95.02552         107.03032         120.79977         154.76196           41         78.66390         88.50954  |        |             |              |             | 57.42303     |             |                   |
| 52         52.50276         57.33450         62.70147         68.66624         75.29883         90.88978           33         55.07784         60.34121         66.20953         72.75623         80.06377         97.34816           34         57.79018         63.45315         69.85791         77.03096         85.06696         104.18375           35         60.46308         66.67401         73.65222         81.49662         90.32031         111.43478           36         63.27594         70.00760         77.59831         86.16397         95.83692         119.12087           37         66.17422         73.45787         81.70225         91.04134         101.62814         127.26812           38         69.15945         77.02889         85.97034         96.13820         107.7955         195.90421           40         75.40126         84.55028         95.02552         107.03092         120.79977         154.76196           41         78.66330         88.50954         99.82654         112.84669         127.83976         165.04768           42         89.02920         92.60797         104.81960         118.9479         135.25175         175.95054           43         85.48389         96.84663 <th>30</th> <th>47.57542</th> <th>51.62268</th> <th>56.08494</th> <th>61.00707</th> <th>66.43885</th> <th>79.05819</th>  | 30     | 47.57542    | 51.62268     | 56.08494    | 61.00707     | 66.43885    | 79.05819          |
| 52         52.50276         57.33450         62.70147         68.66624         75.29883         90.88978           33         55.07784         60.34121         66.20953         72.75623         80.06377         97.34816           34         57.79018         63.45315         69.85791         77.03096         85.06696         104.18375           35         60.46308         66.67401         73.65222         81.49662         90.32031         111.43478           36         63.27594         70.00760         77.59831         86.16397         95.83692         119.12087           37         66.17422         73.45787         81.70225         91.04134         101.62814         127.26812           38         69.15945         77.02889         85.97034         96.13820         107.7955         195.90421           40         75.40126         84.55028         95.02552         107.03092         120.79977         154.76196           41         78.66330         88.50954         99.82654         112.84669         127.83976         165.04768           42         89.02920         92.60797         104.81960         118.9479         135.25175         175.95054           43         85.48389         96.84663 <th>31</th> <th>50.00268</th> <th>54.42947</th> <th>59.32833</th> <th>64.75239</th> <th>70.76079</th> <th>84.80168</th>  | 31     | 50.00268    | 54.42947     | 59.32833    | 64.75239     | 70.76079    | 84.80168          |
| 34         57.79018         63.45315         69.85791         77.03096         85.06696         104.18375           35         60.46208         66.67401         73.65292         81.49662         90.39031         111.43478           36         63.27594         70.00760         77.59831         86.16397         95.83632         119.12087           37         66.17422         73.45787         81.70225         91.04134         101.62814         127.26812           38         69.15945         77.02889         85.97034         96.13820         107.73955         135.93421           39         72.29425         80.72491         90.40915         101.46442         114.09502         145.05846           40         75.40126         84.55028         95.02552         107.03032         120.79977         154.76196           41         78.66390         88.50954         99.82654         112.84669         127.83976         165.04768           42         82.02320         92.60737         104.81960         118.92479         135.23175         175.95054           43         85.46889         96.84663         110.1238         125.27640         142.93934         187.50758           44         89.04641         101.  | 32     | 52.50276    | 57.33450     | 62.70147    | 68.66624     | 75.29883    |                   |
| 35         60.46208         66.67401         73.65222         81.49662         90.32031         111.43478           36         63.27594         70.00760         77.59831         86.16397         95.83632         119.12067           37         66.17422         73.45787         81.70225         91.04134         101.62814         127.26812           38         69.15945         77.02889         85.97034         96.13820         107.7955         135.90421           39         72.29423         80.72491         90.40915         101.46442         114.09502         145.05846           40         75.40126         84.55028         95.02552         107.03092         120.79977         154.76196           41         78.66390         88.50954         99.82654         112.84669         127.83976         165.04768           42         89.02320         92.60797         104.81960         118.92479         155.25175         175.95054           43         85.46389         96.84663         110.01238         125.27640         142.99334         187.50758           45         92.71986         105.78167         121.02939         138.84996         159.70016         212.74951           46         96.50146   | 53     | 55.07784    | 60.34121     | 66.20953    | 72,75623     | 80.06377    | 97.34816          |
| 36         63.27594         70.00760         77.59831         86.16397         95.83632         119,12087           37         66.17422         73.45787         81.70225         91.04134         101.62814         127.26812           38         69.15945         77.02889         85.97034         96.13820         107.7955         135.93421           39         72.28425         80.72491         90.40915         101.46442         114.09502         145.03846           40         75.40126         84.55028         95.02552         107.03092         120.79977         154.76196           41         78.66390         88.50954         99.82654         112.84669         127.83976         165.04768           42         82.02320         92.60737         104.81960         118.92479         135.23175         175.95054           43         85.48389         96.84863         110.01238         125.27640         142.99334         187.50758           44         89.04841         101.23883         115.41288         131.91384         151.14301         199.75808           45         92.71986         104.78167         121.02939         138.84996         159.70016         212.74351           46         96.50146   |        |             |              |             |              |             |                   |
| 37         66.17422         73.45787         81.70225         91.04134         101.62814         127.26812           38         69.15945         77.02889         85.97034         96.13820         107.7955         195.90421           39         72.29423         80.72491         90.40915         101.46442         114.09502         145.05626         145.05628           40         75.40126         84.55028         95.02552         107.03032         120.79977         154.76196           41         78.66390         88.50954         99.82654         112.84669         127.83976         165.04768           42         82.02320         92.60737         104.81960         118.92479         135.23175         175.95054           43         85.46889         96.84863         110.01238         125.27640         142.9934         187.50758           44         89.04641         101.23883         115.41288         131.91384         151.14301         199.75803           45         92.71996         105.78167         121.02939         138.84996         159.70016         212.74351           46         96.50146         110.48403         126.87057         146.09821         168.68516         226.50812           47   |        |             |              |             |              |             |                   |
| Section  |        |             |              |             |              |             |                   |
| 72. 29425 80. 72491 90. 40915 101. 46442 114. 09502 145. 05846 40 75. 40126 84. 55028 95. 02552 107. 03092 120. 79977 154. 76196 11 78. 66390 88. 50954 99. 82654 112. 84669 127. 83976 155. 04768 42 82. 02920 92. 60797 104. 81960 118. 92479 155. 25175 175. 95054 43 85. 48589 96. 84863 110. 01238 125. 27640 142. 99334 187. 50758 44 89. 04441 101. 23853 115. 41288 131. 91884 151. 14301 199. 75803 45 92. 71986 105. 78167 121. 02939 138. 84996 159. 70016 212. 74351 46 96. 50146 110. 48403 126. 87057 146. 09821 168. 68516 226. 50812 47 100. 99650 115. 35097 132. 94539 153. 67263 178. 11942 241. 09861 160. 54065 125. 60185 145. 83973 169. 85996 198. 42666 272. 95840 108. 54065 125. 60185 145. 83973 169. 85996 198. 42666 272. 95840 112. 79687 130. 99791 152. 66708 178. 50303 209. 34800 290. 33590 111. 19749 154. 58006 182. 84596 217. 146. 9891 322. 85616 328. 28142 151. 19749 154. 58006 182. 84596 217. 146. 98997 348. 97831 155. 147. 19749 154. 58006 182. 84596 217. 146. 98997 348. 97831 155. 147. 187. 187. 187. 187. 187. 187. 187. 18   |        |             |              |             |              |             |                   |
| 40   |        |             |              |             |              |             |                   |
| 41   |        |             |              |             |              |             |                   |
| 42         82.02320         92.60737         104.81960         118.92479         135.23175         175.95054           43         85.48889         96.84863         110.01238         125.27640         142.99334         187.50758           44         89.04841         101.23833         115.41288         131.91894         151.14901         199.75808           45         92.71986         105.78167         121.02999         138.84996         159.70016         212.74351           46         96.50146         110.48403         126.87057         146.09821         168.68516         226.50812           47         100.99650         115.55097         132.94559         153.67263         178.11942         241.09861           48         104.40840         120.38826         139.28821         161.58790         188.02559         256.56453           49         108.54065         125.60185         145.83573         169.85936         188.42666         272.9540           50         112.79687         130.99791         152.66708         178.50303         209.34800         290.35590           51         117.18077         136.58284         159.77377         187.53566         220.81539         808.75606           52         1   |        | 75.40126    | 04.33028     | 93.02332    | 107,03032    | 120.79977   | 134.76195         |
| 45   |        |             | 88.50954     | 99.82654    |              |             |                   |
| 44         89,04641         101,23833         115,41288         131,91884         151,14301         199,75809           45         92,71966         106,78167         121,02939         138,84996         159,70016         212,74351           46         96,50146         110,48403         126,87057         146,09821         168,68516         226,50812           47         100,99650         115,35097         132,94539         153,67263         178,11942         241,09861           48         104,40840         120,38826         139,26821         161,58790         188,02539         256,56453           49         106,54065         125,50185         145,83373         169,85936         198,42666         272,95840           50         112,79687         130,99791         152,66708         178,50303         209,34800         290,33590           51         117,18077         136,58284         159,77877         187,53566         220,81539         808,75606           52         121,69620         148,94595         174,85131         206,88863         245,48937         368,97831           54         131,13749         154,59806         182,84596         217,14637         258,77392         370,91701           55  |        |             |              |             |              |             |                   |
| 45         92.71986         105.78167         121.02939         138.84996         159.70016         212.74351           46         96.50146         110.48403         126.87057         146.09821         168.68516         226.50812           47         100.99650         115.35097         132.94539         155.67263         178.11942         241.09861           48         104.40840         120.38886         139.26321         161.58790         188.02539         256.56453           49         108.54065         125.60185         145.83973         169.85996         198.42666         272.95840           50         112.79687         130.99791         152.66708         178.50803         209.34800         290.35590           51         117.18077         136.58284         159.77877         187.53566         220.81539         808.75606           52         121.69690         142.96324         167.16472         196.97477         232.85616         328.28142           53         126.94708         148.34595         174.85181         206.88563         245.87399         348.97831           54         131.19749         154.59806         182.84596         217.14687         258.77392         370.91701           55   |        |             |              |             |              |             |                   |
| 46         96.50146         110.48403         126.87057         146.09921         168.68516         226.50812           47         100.99630         115.35097         132.94539         155.67263         178.11942         241.09861           48         104.40840         120.38826         139.26821         161.58790         188.02539         256.56453           49         104.54065         125.760185         145.83373         169.85936         108.42666         272.95840           50         112.79687         130.99791         152.66708         178.50303         209.34800         290.33590           51         117.18077         136.58284         159.77377         187.59366         220.81539         308.75606           52         121.69620         142.96324         167.16472         196.97477         232.85616         328.28142           53         126.54708         148.34595         174.85131         206.83863         245.48897         348.97831           54         131.19749         154.59806         182.84596         217.14657         258.77392         370.91701           55         136.07162         160.94689         191.15917         227.91796         272.71262         394.17203           56   |        |             |              |             |              |             |                   |
| 100.99650  |        |             |              |             |              |             |                   |
| 104.40840  |        |             |              |             |              |             |                   |
| 108.54065  |        |             |              |             |              |             |                   |
| 112.79687   130.99791   152.66708   178.50803   209.34800   290.33590  |        |             |              |             |              |             |                   |
| 51   |        |             |              |             |              |             |                   |
| 52         121.69620         142.96324         167.16472         196.97477         232.85616         328.28142           53         126.94708         148.34595         174.85131         206.83863         245.49897         348.97831           54         131.19749         154.58066         182.84596         217.14687         258.77392         370.91701           55         136.07162         160.94689         191.15917         227.91796         277.71262         394.17203           56         141.15977         167.58005         199.80554         239.17427         287.34825         418.32235           57         146.38886         174.44593         206.79776         250.93711         302.71566         444.95169           58         151.78003         181.55092         218.14967         268.22928         318.86144         472.64879           59         157.38345         188.90519         227.87566         276.07460         835.79402         508.00772  |        | <u>  </u>   |              |             |              |             |                   |
| 59   126.94708   148.94595   174.85181   206.88563   245.49897   348.97831   54   131.19749   154.59806   182.84536   217.14687   258.77392   370.91701   255.77392   370.91701   255.77392   370.91701   279.71262   394.17203   356.17492   379.80554   239.17427   287.34825   418.32235   379.493    |        |             |              |             |              |             |                   |
| 54     -131.19749     154.59806     182.84596     217.14687     258.77392     370.91701       55     186.07162     160.94689     191.15917     227.91796     272.71262     394.17203       56     141.15377     167.59808     199.80554     239.17427     287.34825     418.82235       57     146.98396     174.44593     208.79776     250.93711     302.71566     444.95169       58     151.78003     181.55092     218.14967     268.22928     318.86144     472.64879       59     157.38345     188.90519     227.87566     276.07460     835.79402     508.0772  |        |             |              |             |              |             |                   |
| 55 186.07162 160.94689 191.15917 227.91796 279.71262 394.17203 56 141.15977 167.58008 199.80554 239.17427 287.94825 416.82255 57 146.98896 174.44593 208.79776 250.93711 302.71566 444.95169 58 151.78008 181.55092 218.14967 268.22928 318.86144 478.64879 59 157.38345 188.90519 227.87566 276.07460 835.79402 508.00772   |        |             |              |             |              |             |                   |
| 56     14115377     167.58003     199.80554     239.17427     287.34825     418.82235       57     146.98836     174.44593     208.79776     250.93711     302.71566     444.95169       58     151.78003     181.55092     218.14967     268.22928     318.86144     478.64879       59     157.38343     188.90519     227.87566     276.07460     835.79402     508.00772   |        | M '         |              |             |              |             |                   |
| 57   146,98886   174,44593   208,79776   250,93711   302,71566   444,95169   58   151,78008   181,55092   218,14967   268,22928   318,86144   478,64879   59   157,38345   188,90519   227,87566   276,07460   835,79402   508,00772   |        |             |              |             |              |             |                   |
| 58   151.78008   181.55092   218.14967   268.22928   318.85144   478.64879   59   157.38345   188.90519   227.87566   276.07460   835.79402   508.00772  |        |             |              |             |              |             |                   |
| 59 157.33345 188.90519 227.87566 276.07460 856.79402 508.00772   |        |             |              |             |              |             |                   |
|  |        |             |              |             |              |             |                   |
| \  |        |             |              |             |              |             |                   |
|  | -      |             |              |             | 1            | \$-83       | <del></del>       |

TABLE LXIII.

FRESENT VALUE OF AN ANNUITY OF £.1, COMPOUND INTEREST.

| Years.    | S per Cent.          | 34 per Cent.         | 4 per Cent.                   | 4½ per Cent.                  | 5 per Cent.                | 6 per Cen            |
|-----------|----------------------|----------------------|-------------------------------|-------------------------------|----------------------------|----------------------|
| 1         | 0:97087              | 0.96618              | 0.96154                       | 0.95694                       | 0.95238                    | 0.94840              |
| 2         | 1.91347              | 1.89969              | 1.88610                       | 1.87267                       | 1.85941                    | 1.83839              |
| 8         | 2.82861              | 2.80164              | 2.77509                       | 2.74896                       | 2.72325                    | 2.67301              |
| 4         | 3.71710              | 3.67308              | 3.62990                       | 3.58753                       | 3.54595                    | 3.46511              |
| 5         | 4.57971              | 4.51505              | 4.45182                       | 4.38998                       | 4.32948                    | 4.21236              |
| 6         | 5.41719              | 5.32855              | 5.94214                       | 5.15787                       | 5.07569                    | 4.91732              |
| 7         | 6.23028              | 6.11454              | 6.00205                       | 5.89270                       | 5.78637                    | 5.58 <b>2</b> 98     |
| 8         | 7.01969              | 6.87396              | 6.79274                       | 6.59589                       | 6.46321                    | 6.20979              |
| 9         | 7.78611              | 7.60769              | 7.43533                       | 7.26879                       | 7.10782                    | 6.80169              |
| 10        | 8.53020              | 8.31661              | 8.11090                       | 7.91272                       | 7.72173                    | 7.36009              |
|           | <del></del>          |                      |                               | 0. #2000                      | 0.00044                    | 7.88687              |
| 11        | 9.25263              | 9.00155              | 8.76048                       | 8.52892                       | 8.30641                    | 8.38384              |
| 12        | 9.95400              | 9.66333              | 9,38507                       | 9.11858                       | 8.86325                    | 8.85268              |
| 13        | 10.63495             | 10.30274             | 9.98565                       | 9.68285<br>10.22283           | 9.89857<br>9.89864         | 9.29498              |
| -14       | 11.29607             | 10.99052             | 10.56312                      | 10.73955                      | 10.37966                   | 9.71225              |
| 15<br>16  | 11.93794             | 11.51741             | 11.11839<br>11.65 <b>2</b> 30 | 11.23402                      | 10.88777                   | 10.10589             |
| 17        | 12.56110             | 12.09412             | 12.16567                      | 11.70719                      | 11.27407                   | 10.47726             |
| 18        | 13.16612<br>13.75351 | 12.65132             | 12.65930                      | 12.15999                      | 11.68959                   | 10.82760             |
| 19        | 14.32390             | 13.18968<br>13.70984 | 13.13394                      | 12.59329                      | 12.08592                   | 11.15812             |
| 20        | 14.87747             | 14.21240             | 13.13394                      | 13.00794                      | 12.46221                   | 11.46992             |
|           |                      | 11.21270             |                               |                               |                            |                      |
| 21        | 15.41502             | 14.69797             | 14.02916                      | 13.40479                      | 12.82115                   | 11.76408             |
| 22        | 15.93692             | 15.16712             | 14.45112                      | 13.78449                      | 13.16300                   | 12.04158             |
| 25        | 16.44361             | 15.62041             | 14.85684                      | 14.14777                      | 13.48857                   | 12.30398             |
| 24        | 16.93554             | 16.05837             | 15.24696                      | 14.49548                      | 13.79864                   | 12.55086             |
| 2.5       | 17.41315             | 16.48151             | 15.62208                      | 14.82821                      | 14.09394                   | 12.78396<br>13.00317 |
| 26        | 17.87684             | 16.89035             | 15.98277                      | 15.14661                      | 14.97519<br>14.64308       | 19.21053             |
| 27        | 18.32703             | 17.28536             | 16.32959                      | 15.451S0<br>15.74287          | 14.89813                   | 13.40616             |
| 28<br>29  | 18.76411             | 17.66702             | 16.66306                      | 16.02189                      | 15.14107                   | 18.59072             |
| 30        | 19.18845<br>19.60044 | 18.03577             | 16.98371<br>17.29203          | 16.28889                      | 15.57245                   | 13.76483             |
|           | 13.00011             | 18.39205             | 17.29200                      |                               |                            |                      |
| 91        | 20.00045             | 18.73628             | 17.58849                      | 16.54439                      | 15. <b>5</b> 9 <b>2</b> 81 | 13.92909             |
| 32        | 20.38877             | 19.46887             | 17.87855                      | 16.78889                      | 15.80268                   | 14.08404             |
| S3        | 20.76579             | 19.39021             | 18.14765                      | 17.02286                      | 16.00255                   | 14.23023             |
| 34        | 21.13184             | 19.70068             | 18.41120                      | 17.24676                      | 16.19290                   | 14.36814             |
| 35        | 21.48722             | 20.00066             | 18.66461                      | 17.46101                      | 16.37419                   | 14.49825             |
| 36        | 21.83425             | 20.29049             | 18.90828                      | 17.66604                      | 16.54685                   | 14.62099<br>14.73678 |
| 87        | 22.16724             | 20.57053             | 19.14258                      | 17.86224                      | 16.71129<br>16.86789       | 14.84602             |
| 38.<br>39 | 22.49246             | 20.84109             | 19.36786                      | 18.04999<br>18. <b>229</b> 66 | 17.01704                   | 14.94907             |
|           | 22.80822             | 21.10250             | 19.58448                      | 18.40158                      | 17.15909                   | 15.04630             |
| 40        | 23.11477             | 21.35507             | 19.79277                      |                               |                            |                      |
| 41        | 23.41240             | 21.59910             | 19.9930 <i>5</i>              | 18.56611                      | 17.29487                   | 15.13802             |
| 42        | 23.70136             | 21.83488             | <b>2</b> 0.18 <i>5</i> 63     | 18.72355                      | 17.42321                   | 15.22454             |
| 43        | 23.98190             | 22.06269             | 20.37079                      | 18.87421                      | 17.54591                   | 15.30617             |
| 44        | 24.25427             | 22.28279             | 20,54884                      | 19.01938                      | 17.66277                   | 15.38318             |
| 45        | 24.51871             | 22.49545             | 20.72004                      | 19.1 <i>5</i> 63 <i>5</i>     | 17.77407                   | 15.45583             |
| 46        | 24.77545             | 22.70092             | 20.88465                      | 19.28837                      | 17.88007                   | 15.52437             |
| 47        | 25.02471             | 22.89944             | 21.04294                      | 19.41471                      | 17.98102                   | 15.58903             |
| 48        | 25.26671             | 23.09124             | 21.19513                      | 19.53561                      | 18.07716                   | 15 65008             |
| 49        | 25.50166             | 23.27656             | 21.94147                      | 19.65130                      | 18.16872                   | 15.70757<br>15.76186 |
| 50        | 25.72976             | 23.45562             | 21.48218                      | 19.76201                      | 18.25593                   | 13.70100             |
| 51        | 25.95123             | 23.62862             | 21.61748                      | 19.86795                      | 18.33898                   | 15.81308             |
| 52        | 26.16624             | 23.79576             | 21.74758                      | 19.96933                      | 18.41807                   | 15.86139             |
| 53        | 26.37499             | 23.95726             | 21.87267                      | 20.06694                      | 18. <b>49340</b>           | 15.90697             |
| 54        | 26.57766             | 24.11329             | 21.99296                      | <b>2</b> 0.1 <i>5</i> 918     | 18.56515                   | 15.94998             |
| 55        | 26.77443             | 24.26405             | <b>2</b> 2.10861              | 20.24802                      | 18.63347                   | 15.99054             |
| 56        | 26.96546             | 24.40971             | 22.21982                      | 20.33303                      | 18.69854                   | 16.02881             |
| 57        | 27.15094             | 24.55045             | 22.32675                      | 20.41499                      | 18.76052                   | 16.06492             |
| 58        | 27.53100             | 24.68642             | 22.42957                      | 20.49224                      | 18.81954                   | 16.09898             |
| 59        | 27.50583             | 24.81780             | 22.52843                      | 20,56673                      | 18.87575                   | 16.15111             |
| 60        | 27.67556             | 24.94473             | 22.62349                      | 20.63802                      | 18.92929                   | 16.16143             |
|           |                      |                      |                               |                               |                            | -                    |

TABLE LXIV.

ANNUITY WHICH £.1 WILL PURCHASE, COMPOUND INTEREST.

| Years.        | 3 per Cent.        | 3½ per Cent.       | 4 per Cent. | 44 per Cent.               | 5 per Cent.      | 6 per Cent-        |
|---------------|--------------------|--------------------|-------------|----------------------------|------------------|--------------------|
| <del></del> 1 | 1.080000           | 1,035000           | 1.040000    | 1.045000                   | 1.050000         | 1.060000           |
| 2             | .522610            | .526400            | .530196     | .533997                    | .537805          | .545437            |
| 5             | .353530            | .356931            | .360348     | .363773                    | .367208          | .374109            |
| 4             | .269027            | .272251            | .275490     | .278743                    | .282011          | .288591            |
| 5             | .218354            | .221481            | .224627     | .227791                    | .230974          | .237396            |
| 6             | .184597            | .187668            | .190762     | .193878                    | .197016          | .203362            |
| . 7           | .160.506           | .163544            | .166609     | .169701                    | .172820          | .179135            |
| 8             | .142456            | .145476            | 148527      | .151609                    | .154722          | .161036            |
| 9             | .128434            | .131446            | .134493     | .137574                    | .140690          | .147022            |
| 10            | .117230            | .120241            | .123291     | .126378                    | .129504          | .135868            |
| 11            | .103077            | .111092            | .114149     | .117248                    | .120389          | .126793            |
| 12<br>13      | .100462            | .103484            | .106552     | .109666<br>.10327 <b>5</b> | .112825          | .119277            |
| 14            | .094029            | .091570            | .094669     | .097820                    | .101024          | .112960<br>.107584 |
| 15            | .083766            | .086825            | .089941     | .093114                    | .096342          | .102962            |
| 16            | .079611            | .082684            | .085820     | .089015                    | .092269          | .098952            |
| 17'           | .075952            | .079043            | .082198     | .085417                    | .088699          | .095444            |
| 18            | .072708            | .075816            | .078998     | .082237                    | .085546          | .092356            |
| 19            | .069813            | .072940            | .076138     | .079407                    | .082745          | .089620            |
| 20            | .067215            | .070361            | .073582     | .076876                    | .080242          | .087184            |
| 21            | .064871            | .068036            | .071280     | .074600                    | .077996          | .085004            |
| 22            | .062747            | .065932            | .069198     | .072545                    | .07 <i>5</i> 970 | .083045            |
| 23            | .060813            | .064018            | .067309     | .070682                    | .074136          | -081278            |
| 24            | .059047            | .062273            | .065586     | .068987                    | .072471          | .079679            |
| 25            | .057427            | .060674            | .064012     | .067435                    | .070952          | .078226            |
| 26            | .055938            | .059205            | .062567     | .066021                    | .069564          | .076904            |
| 27<br>28      | .054564            | .057852            | .061238     | .064719                    | .068292          | .075697            |
| 29            | .053293            | .056602            | .060013     | .063521                    | .067122          | .074592            |
| 30            | .051019            | .054371            | .057830     | .061391                    | .065051          | .072649            |
| Sl            | - ,049999          | .053372            | .056855     | .060443                    | .064132          | .071752            |
| 32            | .049046            | .052441            | .055948     | .059563                    | .063280          | .071002            |
| 33            | .048156            | .051572            | .035104     | .058744                    | .062490          | .070278            |
| 34            | .047322            | .050759            | .054315     | .057982                    | .061755          | .069.598           |
| 35            | .046539            | .049998            | .053577     | .057270                    | .061072          | .068974            |
| 36            | .043804            | .049284            | .052887     | .056606                    | .060434          | .068395            |
| <b>37</b>     | .045111            | .048613            | .052239_    | .055984                    | .059840          | .067857            |
| <b>58</b>     | .044459            | .047982            | .051632     | ,055402                    | ,059284          | .067358            |
| . 89          | .043844            | .047387            | .051061     | .054857                    | .058764          | .066894            |
| 40            | .043262            | .046827            | .050523     | .054843                    | .058278          | .066462            |
| 41            | .042712            | .046298            | .050017     | .053861                    | .057822          | .066059            |
| 42<br>43      | .042191<br>.041698 | .045798<br>.045325 | .049540     | .053408                    | .057\$95         | .065683            |
| 44            | .041230            | .043323            | .048664     | .052581                    | .056616          | .065006            |
| 45            | .040785            | .044453            | .048262     | .052301                    | .056262          | .064701            |
| 46            | .040362            | .044051            | .047882     | .051845                    | .055928          | .064415            |
| :47           | .039960            | .043669            | .047522     | .051507                    | .055614          | .064148            |
| 48.           | .039577            | .043306            | .047181     | 051188                     | .055318          | .063898            |
| 49            | .039213            | .042962            | .046857     | .050887                    | .055039          | .063664            |
| 50            | .038865            | .042634            | .046550     | .050602                    | .054777          | .063444            |
| 51            | .038534            | .042322            | .046259     | .050332                    | .054529          | .063239            |
| <b>52</b> .   | .038217            | .042024            | .045982     | .050077                    | .054294          | .063046            |
| <b>5</b> 3    | .037915            | .041741            | .045719     | .049835                    | 054073           | .062865            |
| 54<br>55      | .037626            | .041471            | .045469     | .049605                    | .053864          | .062696            |
| 55<br>56      | .037349            | .040967            | .045231     | .049181                    | .053667          | .062537            |
| • <b>57</b>   | .036831            | .040732            | .044789     | .048985                    | .053308          | .062247            |
| 58            | 036588             | .040508            | .044584     | .048789                    | .053136          | .062116            |
| 59            | .036356            | .040294            | .044988     | 048622                     | .052978          | .061992            |
| . 60          | .036133            | .039929            | .044202     | .048454                    | .052828          | .061876            |
| '             |                    |                    |             |                            |                  |                    |

TABLE LXV.
PROBABILITIES OF LIFE AT DIFFERENT PLACES.

| -          | :_          |          |             |       |             |             |            |             |             |             |             |             |
|------------|-------------|----------|-------------|-------|-------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|
|            | Vien-       | 1        | Lon-        | Nor-  | North-      | Bres-       | Edin-      | Bran-       | Holy        | Hol-        | 1           | Vaud ir     |
| Age.       | na.         | Berlin.  | don.        | wich. | amp.        | law.        | burgh.     | denb.       | Cross.      | land.       | France      | Switzer     |
| 1160       |             |          | 4011        |       | ш.р.        |             |            |             |             |             |             |             |
| 0          | 1000        | 1000     | 1000        | 1000  | 1000        | 1000        | 1000       | 1000        | 1000        | 1000        | 1000        | 1000        |
| 1          | 542         | 638      | 680         | 798   | 738         | 769         | 814        | 775         | 882         | 804         | 805         | 811         |
| 2          | 471         | 528      | 548         | 651   | 628         | 658         | 716        | 718         | 762         | 768         | 777         | 765         |
|            |             | 105      |             | 031   |             | 030         |            |             |             |             | 750         |             |
| 3          | 430         | 485      | 492         | 595   | 585         | 614         | 663        | 687         | 717         | 736         | 750         | 735         |
| 4          | 400         | 484      | 452         | 566   | 562         | 585         | 625        | 664         | 682         | 709         | 727         | 715         |
| 5          | 377         | 408      | 426         | 544   | 544         | 563         | 599        | 642         | <b>6</b> 59 | 689         | 711 .       | 701         |
| 6          | 357         | 387      | 410         | 526   | 530         | 546         | 580        | 622         | <b>6</b> 36 | 676         | 697         | 688         |
| 7          | 344         | 376      | 397         | 511   | 518         | 532         | 564        | 607         | 618         | 664         | 686         | 677         |
| 8          | 337         | 367      | 388         | 500   | 510         | 523         | 551        | 595         | 604         | 652         | 676         | 667         |
|            |             |          |             |       |             |             |            |             |             |             |             |             |
| 9          | <b>3</b> 31 | 361      | 380         | 490   | 504         | 515         | 540        | 585         | <b>5</b> 95 | 646         | 667         | 659         |
| 10         | 326         | 356      | 373         | 481   | 498         | 508         | 532        | 57 <b>7</b> | 589         | 639         | 660         | 653         |
|            |             |          |             |       |             |             |            |             | 585         |             | 654         | 033         |
| 11         | 322         | 959      | 367         | 474   | 493         | 502         | 527        | 570         |             | 633         |             | 648<br>643  |
| 12         | 318         | 350      | 361         | 469   | 488         | 497         | 522        | 564°        | <i>5</i> 81 | 627         | 649         | 643         |
| 13         | 314         | 347      | 356         | 464   | 484         | 492         | 516        | 559         | 577         | 621         | 644         | 639         |
| 14         | 310         | 344      | 351         | 460   | .480        | 488         | 511        | <b>5</b> 54 | <b>5</b> 73 | 616         | 639·        | 635         |
| 1.5        | 506         | 341      | 347         | 455   | 475         | 483         | 506        | 549         | 569         | 611-        | 635         | 631         |
| 16         | 302         | 338      | 343         | 451   | 470         | 479         | 501        | 544         | 565         | 606         | <b>6</b> 31 | 626         |
|            |             |          |             |       |             |             |            |             |             |             | 001         |             |
| 17         | 299         | 935      | 338         | .446  | 465         | 474         | 495        | 539         | 560         | 601         | 626         | 62 <b>2</b> |
| 18         | 295         | 332      | <b>3</b> 34 | 442   | <b>4</b> 59 | -470        | 490        | 535         | 555         | 596         | 621.        | 618         |
| 19         | 291         | 328      | 329         | 437   | 453         | <b>4</b> 65 | 485        | <b>5</b> 31 | <b>5</b> 50 | <b>5</b> 90 | 616         | 614         |
|            |             |          |             |       |             |             | <u></u> -  |             |             |             | 10:-        |             |
| 20         | . 287       | 324      | 325         | 432   | 447         | 461         | 480        | 527         | 545         | <b>584</b>  | 610         | 610         |
| - 21       | 284         | 320      | 321         | 426   | 440         | 456         | 474        | 522         | 539         | 577         | 604         | 606         |
| 92         | 280         | 315      | 316         | 421   | 433         | 451         | 469        | 517         | 532         | 571         | 598         | 602         |
| 23         | 276         | 310      | 310         | 415   | 426         | 446         | 468        | 512         | 525         | 566         | 592         | 597         |
| 24         | 273         | 305      | 305         | 409   | 419         | 441         | 458        | 507         | <i>5</i> 18 | 559         | 586         | 592         |
| 25         | 269         | 297      |             |       |             | 436         |            | 502         | 512         |             | 580         |             |
|            |             |          | 299         | 404   | 412         | 400         | 453        |             |             | 551         |             | 587         |
| 26         | 265         | 293      | 294         | 398   | 405         | 431         | 447        | 498         | 506         | 543         | 574         | 582         |
| 27         | 261         | 287      | 288         | -392  | 398         | 426         | 442        | 495         | 501         | 535         | <i>5</i> 68 | 577         |
| 28         | 256         | 281      | 283         | 385   | 391         | 421         | 437        | 492         | 496         | -526        | 562         | 572         |
| 29         | 251         | 275      | 278         | 378   | 384         | 415         | 432        | 489         | 491         | 817         | 556         | 567 ·       |
|            |             | <u> </u> |             |       |             |             |            |             |             | <u> </u>    |             |             |
| 30         | 247         | 269      | 272         | 372   | 378         | 409         | 426        | 486         | 486         | 508         | <i>55</i> 0 | 563         |
| 31         | 243         | 264      | 266         | 366   | 372         | 403         | 421        | 482         | 481         | 499         | 544         | <i>55</i> 8 |
| . 32       | 239         | 259      | 260         | 361   | 366         | 897         | 416        | 477         | 476         | 490         | 538         | <b>5</b> 53 |
| 89         | 235         | 254      | 254         | 355   | 360         | 391         | 410        | 472         | 471         | 482         | 582         | 548         |
| 34         | 231         | 249      |             |       | 074         | 384         |            | 467         | 466         | 474         | 526         | 544         |
|            |             |          | 248         | 350   | 354         |             | 405        |             |             |             | 520         |             |
| 35         | 226         | 243      | 242         | 344   | 348         | 377         | 400        | 462         | 460         | 467         | 520         | 539         |
| 36         | 221         | 237      | 236         | 338   | 342         | 370         | 394        | 456         | 454         | 460         | 514         | 533         |
| 37         | 216         | 230      | 230         | 333   | 336         | <b>3</b> 63 | 388        | 450         | 447         | 453         | 508         | 527         |
| 38         | 211         | 223      | 224         | 327   | 330         | 356         | 382        | 444         | 440         | 446         | 503         | 520         |
| 39         | 205         | 216      | 218         | 322   | 324         | 349         | 376        | 438         | 433         | 439         | 497         | 513         |
|            |             | <u> </u> |             |       |             |             |            |             |             |             |             | <u> </u>    |
| 40         | 199         | 209      | 214         | 817   | 317         | 342         | 369        | 432         | 426         | 432         | 492         | <i>5</i> 06 |
| 41         | 194         | 203      | 207         | 311   | 310         | <b>3</b> 35 | 363        | 427         | 418         | 425         | 487         | <i>5</i> 00 |
| 42         | 189         | 197      | 201         | 306   | 303         | 328         | 356        | 422         | 410         | 419         | 482         | 494         |
| 43         | 185         | 192      | 194         |       | 296         | 321         | 349        | 417         | 401         | 413         | 476         | 488         |
|            |             | 192      |             | 300   |             |             |            |             |             |             | 471         |             |
| 44         | .181        | 187      | 187         | 294   | 289         | 314         | 341        | 412         | 393         | 407         | 471         | 482         |
| 45         | 176         | 182      | 180         | 287   | 282         | 307         | 333        | 407         | 386         | 400         | 466         | 476         |
| 46         | 171         | 177      | 174         | 281   | 275         | 299         | 325        | 400         | 379         | 393         | 460         | 469         |
| 47         | 165         | 172      | 167         | 274   | 268         | 291         | 317        | 394         | 372         | 386         | 455         | 461         |
| 48         | 159         | 167      | 159         | 268   | 261         | 283         | 309        | 388         | 365         | 378         | 449         | 451         |
| 49         | 158         | 162      | 153         | 261   | 254         | 275         | 301        | 381         | 359         | 370         | 413         | 441         |
| 1 25       |             | 102      | 133         | 201   | 204         | 210         | 201        | 701         |             | 370         |             |             |
| 50         | 147         | 157      | 147         | 255   | 247         | 267         | 293        | 374         | 353         | 362         | 436         | 491         |
| 51         | 142         | 152      | 141         | 248   | 239         | 259         | 286        | 367         | 347         | 354         | 429         | 422         |
| 52         | 137         | 147      |             |       |             | 250         |            | 359         | 340         | 342         | 422         | 41.1        |
|            |             |          | 185         | 242   | 232         |             | 278        |             |             |             |             |             |
| <i>5</i> 3 | 133         | 142      | 130         | 235   | 225         | 241         | 270        | 351         | 333         | 336         | 414         | 406         |
| 54         | 128         | 137      | 125         | 228   | 218         | 232         | 963        | 343         | 326         | 327         | 406         | 897         |
| 55         | 123         | 132      | 120         | 221   | 211         | 224         | 256        | 334         | 318         | 318         | 397         | 388         |
| 56         | 117         | 127      | 116         | 213   | 204         | 216         | 250        | 324         | 310         | 309         | 388         | 37 <b>7</b> |
| 57         | 111         | 121      | 111         | 206   | 197         | 209         | 243        | 314         | 301         | 500         | 379         | 364         |
| 58         | 106         | 115      | 106         | 199   | 190         | 201         | 235        | 304         | 292         | 291         | 369         | 548         |
| 59         | 101         | 109      | 101         | 191   | 183         | 198         | 233<br>227 | 293         | 283         | 282         | 359         | 331         |
| 29 (       | 101         | 109      | 101         | 191   | 193         | 193         | 22/        | 293         | 200         | 202         | 209         | 1321.       |
| l          | ,           |          |             |       |             |             |            |             |             |             |             |             |

TABLE LXV. PROBABILITIES OF LIFE, AT DIFFERENT PLACES.

| ge.        | Vien-<br>na. | Berlin. | Lon-<br>don. | Nor-<br>wich. | North-<br>ampt | Bres-<br>law. | Edin-<br>burgh. | Bran-<br>denb. | Holy<br>Cross. | Hol-<br>land. |     | Vaud in!<br>Switzer. |
|------------|--------------|---------|--------------|---------------|----------------|---------------|-----------------|----------------|----------------|---------------|-----|----------------------|
| 60         | 96           | 103     | 96           | 184           | 176            | 186           | 219             | 282            | 273            | 273           | 349 | 314                  |
| 61         | 91           | 97      | 92           | 177           | 169            | 178           | 210             | 271            | 263            | 264           | 339 | 299                  |
| 62         | 87           | 92      | 87           | 169           | 162            | 170           | 201             | 260            | 253            | 255           | 329 | 286                  |
| 63         | 82           | 88      | 83           | 161           | 155            | 163           | 191             | 248            | 243            | 245           | 318 | 274                  |
| 64         | . 77         | 84      | .78          | 158           | 148            | 155           | 182             | 236            | 233 .          | 235           | 307 | 262                  |
| 65         | 72           | 80      | 74           | 144           | 141            | 147           | 178             | 224            | 223            | 225           | 296 | 250                  |
| 66         | 67           | 75      | 70           | 136           | 134            | 140           | 163             | 213            | 213            | 215           | 285 | 236                  |
| 67         | 62           | . 70    | 65           | . 128         | 127            | 132 •         | 154             | 202            | 203            | 205           | 273 | 220                  |
| 68         | 57           | 65      | 61           | 119           | 120            | 124           | 145             | 190            | 193            | 195           | 260 | 202                  |
| 69         | 52           | 60      | <b>5</b> 6'  | 111           | 131            | 117           | 135             | 178            | 182            | 185           | 246 | 184                  |
| 70         | 48           | 55      | 52           | 103           | 106            | 109           | 126             | 166            | 171            | 175           | 232 | 168                  |
| 71         | 44           | 51      | 47           | 94            | 99             | 101           | 117             | 153            | 161            | 165           | 218 | 153                  |
| 72         | 40           | 47      | 43           | 86            | 92             | 93            | 108             | 138            | 151            | 155           | 195 | 140                  |
| 73         | 36           | 43      | 39           | 79            | 85             | 85            | 100             | 122            | 142            | 145           | 188 | 129.                 |
| 74         | 53           | 39      | 35           | 71            | 78             | 77            | 92              | 107            | 134            | 135           | 173 | 119                  |
| 75         | 50           | 35      | 32           | 64            | 75             | 69            | 84              | 93             | 126            | 125           | 158 | 109                  |
| .76        | 27           | 32      | 28           | 57            | 64             | 61            | 76              | 80             | 119            | 114           | 144 | 98                   |
| 77         | 24           | 29      | 25           | 50            | 58             | 53            | €8              | 68             | 112            | 103           | 129 | 85                   |
| 78         | 21           | 26      | 22           | 43            | 52             | 45            | 60              | 59             | 105            | 92            | 115 | 71                   |
| <b>7</b> 9 | 18           | 23      | 19           | 37            | 46             | 38            | 52              | 51             | 98             | 82            | 102 | 58                   |
| 80         | 16           | 20      | 17           | 32            | 40             | 32            | 45              | 44             | 90             | 72            | 88  | 46                   |
| 81         | 14           | 18      | 14           | 27            | 54             | . 26          | 39              | 38             | 81             | 62            | 75  | 36                   |
| 82         | 12           | 16      | 12           | 23            | 28             | 22            | 33              | 32             | 71             | 53            | 63  | 29                   |
| 83         | 10           | 14      | 10           | 19            | 23             | 18            | 28              | 25             | 61             | 45            | 53  | 24                   |
| 84         | 8            | 12      | 8            | 16            | 19             | 15            | 24              | 21             | 51             | 38            | 44  | 20                   |
| 85         | 7            | 10      | 7            | 13            | 16             | 12            | 20              | 15             | 41             | 31            | 36  | 17                   |
| <b>8</b> 6 | 6            | 8       | 6<br>5       | 10            | 19             | 9             | 16              | 11             | 32             | 25            | 28  | 14                   |
| 87         | 5 4          | 7       | 5            | 8             | 11             | 6             | 12              | 8              | 24             | 19            | 21  | 11                   |
| 88         |              | 6       | 4            | 6             | 8              | 4             | 9               | 6              | 17             | 14            | 16  | 9 7                  |
| 89         | 3            | 5       | 3            | 5             | 6              | 2             | 7               | 4              | 11             | 10            | 12  | . 7                  |
| 90         | 2            | 4       | 1 2          | 4             | 4              | 1             | 4               | 3              | 7              | 7             | 8   | 5                    |

TABLE LXVI.
VALUE OF AN ANNUITY ON A SINGLE LIFE.

|      | Yea     | rs value | at         | Years value at |          |          |            |      | Years value at |            |            |  |
|------|---------|----------|------------|----------------|----------|----------|------------|------|----------------|------------|------------|--|
| Age. | p. cent | lp.cent. | 5 p. cent. | Age            | 3p.cent. | 4p cent. | 5 p. cent. | Age. | 3 p. cent.     | 4 p. cent. | 5 p. cent. |  |
| 6    | 18.8    | 16.2     | 14.1       | 30             | 15.0     | 13.1     | 11.6       | 53   | 10.7           | 9.6        | 8.8        |  |
| 7    | 18.9    | 16.3     | 14.2       | 31             | 14.8     | 12.9     | 11.4       | 54   | 10.5           | 9.4        | 8.6        |  |
| ,8   | 19.0    | 16.4     | 14.8       | 32             | 14.6     | 12.7     | 11.9       | 55   | 10.3           | 9.3        | 8.5        |  |
| 1&10 | 19.0    | 16.4     | 14.3       | 33             | 14.4     | 12.6     | 11.2       | 56   | 10.1           | 9.1        | 8.4        |  |
| 11   | 19.0    | 16.4     | 14.3       | 34             | 14.2     | 12.4     | 11.0       | 57   | 9.9            | 8.9        | 8.2        |  |
| 12   | 18.9    | 16.5     | 14.2       | 35             | 14.1     | 12.3     | 10.9       | 58   | 9.6            | 8.7        | 8.1        |  |
| 13   | 18.7    | 16.2     | 14.1       | 36             | 13.9     | 12.1     | 10.8       | 59   | 9.}            | 8.6        | 8.0        |  |
| 14   | 18.5    | 16.0     | 14.0       | 37             | 13.7     | 11.9     | 10.6       | 60   | 9.2            | 8.4        | 7.9        |  |
| 15   | 18.3    | 15.8     | 18.9       | 38             | 13.5     | ¥1.8     | 10.5       | 61   | 8.9            | 8.2        | 7.7        |  |
| 16   | 18.1    | 15.6     | 19.7       | 39             | 13.3     | 11.6     | 10.4       | 62   | 8.7            | 8.1        | 7.6        |  |
| 17   | 17.9    | 15.4     | 13.5       | 40             | 13.2     | 11.5     | 10.3       | 63   | 8.5            | 7.9        | 7.4        |  |
| 18   | 17.6    | 15.2     | 13.4       | 41             | 13.0     | 11.4     | 10.2       | 64   | 8.3            | 7.7        | 7.3        |  |
| 19   | 17.4    | 15.0     | 13.2       | 42             | 12.8     | 11.2     | 10.1       | 65   | 8.0            | 7.5        | 7.1        |  |
| 20   | 17.2    | 14.8     | 13.0       | 43             | 12.6     | 11,1     | 10.0       | 66   | 7.8            | 7.3        | 6.9        |  |
| 21   | 17.0    | 14.7     | 12.9       | 44             | 12.5     | 11.0     | 9.9        | 67   | 7.6            | 7.1        | 6.7        |  |
| 22   | 16.8    | 14.5     | 12.7       | 45             | 12.8     | 710.8    | 9.8        | 68   | 7.4            | 6.9        | 6.6        |  |
| 23   | i6.5    | 14.3     | 12.6       | 46             | 12.1     | 10.7     | 9.7        | 69   | 7.1            | 6.7        | 6.4        |  |
| 24   | 16.3    | 14.1     | 12.4       | 47             | 11.9     | 10.5     | 9.5        | 70   | 6.9            | 6.5        | 6.2        |  |
| 25   | 16.1    | 14.0     | 12.3       | 48             | 11.8     | 10.4     | 9.4        | 71   | 6.7            | 6.3        | 6.0        |  |
| 26   | 15.9    | 13.8     | 12.1       | 49             | 11.6     | 10.2     | 9.3        | 72   | 6.5            | 6.1        | 5.8        |  |
| 27   | 15.6    | 13.6     | 12.0       | 50             | 11.4     | 10.1     | 9.2        | 73   | 6.2            | 5.9        | 5.6        |  |
| 28   | 15.4    | 13.4     | 11.8       | 51             | 11.2     | 9.9      | 9.0        | 74   | 5.9            | 5.6        | 5.4        |  |
| 29   | 15.2    | 19.2     | 11,7       | 52             | 11.0     | 9.8      | 8.9        | 75   | 5.6            | 5.4        | 5.2        |  |

TABLE LXVIL

VALUE OF AN ANNUITY ON TWO JOINT LIVES.

| Age of the Younger   Elder   3 p. cent   4 p. cent   5 p. cent   Value at Younger   Elder   3 p. cent   4 p. cent   5 p. cent   Younger   Elder   8 p. cent   5 per cent   5 per cent   10   14.7   13.0   11.6   1.5   14.3   12.7   11.3   25   10.3   25   13.1   11.6   10.2   25   13.1   11.6   10.2   29.1   10   40   10.7   9.6   8.6   60   6.5   6.7    | II          | C . 1  |            | **        |            | 0 A         |        |            | \$7-1 a |     |
|--|-------------|--------|------------|-----------|------------|-------------|--------|------------|---------|-----|
| 10   |             |        |            | V alue at |            |             |        |            |         |     |
| 15   | Younger.    | Elder. | 3 p. cent. |           | 5 p. cent. | Younger.    | Elder. | 3 p. cent. |         |     |
| 20   |             |        |            |           |            |             |        |            |         |     |
| 10   40   10.7   9.6   8.6   6.5   6.1   5.7   5.5   5.2   11.9   10.6   9.5   11.9   10.6   10.6   9.5   11.9   10.6      |             |        |            |           |            |             |        |            |         |     |
| 10   | ll l        |        |            |           |            |             |        |            |         |     |
| 10   | H 1         |        |            |           |            | 90          |        |            |         |     |
| 10   | H :         |        |            |           |            | 1 30        |        |            |         |     |
| 45   | 10          |        |            |           |            |             |        |            |         |     |
| 55         8.6         7.8         7.1         7.5         5.1         4.9         4.7           60         7.8         7.2         6.6         6.1         8.5         9.9         8.8         8.0           70         6.1         5.8         5.5         7.7         7.5         5.3         5.1         4.9         4.7           20         13.3         11.8         10.5         4.9         8.9         8.1         7.4           20         13.3         11.8         10.5         60         7.1         6.6         6.6           30         11.9         10.6         9.5         8.7         7.7         7.1         6.6         6.4         6.0         5.6         6.4         6.0         5.6         6.4         6.0         5.6         6.4         6.0         5.6         6.4         6.0         5.6         6.4         6.0         5.6         6.4         6.0         5.6         6.4         6.0         5.6         6.4         6.0         5.6         6.4         6.0         5.6         6.4         6.0         7.5         5.0         4.8         7.1         6.5         6.4         6.8         7.1         6.8   |             |        |            |           |            | 1 4         | 65     | 6.5        |         |     |
| 60 7.8 7.2 6.6 6 65 6.9 6.5 6.1 5.8 5.5 7.7 6.1 5.8 5.5 7.5 5.3 5.1 4.9  15 18.9 12.3 11.0 55 55 7.7 7.1 6.6 25 12.6 11.2 10.1 30 11.8 10.5 50 8.9 8.2 7.4 60 7.5 7.0 6.5 6.5 6.4 6.0 6.5 6.9 6.4 6.0 6.5 6.7 6.9 9.6 7.0 6.4 6.0 6.5 6.6 6.9 9.8 8.8 8.0 7.4 6.9 9.2 8.4 4.6 6.9 9.2 8.4 4.6 6.9 9.2 8.4 4.6 6.9 9.2 8.4 4.6 6.9 9.2 8.4 4.6 6.9 9.2 8.8 8.0 7.4 6.9 9.2 8.4 4.6 6.9 9.2 8.8 8.0 7.4 6.9 9.2 8.8 8.0 7.4 6.9 9.2 8.8 8.0 7.4 6.9 9.2 8.4 4.6 9.5 7.4 6.9 9.2 8.4 4.6 9.5 7.4 6.9 9.2 8.4 4.6 9.5 7.4 6.9 9.2 8.4 4.6 9.5 7.4 6.9 9.2 8.4 4.6 9.5 8.8 8.0 7.4 6.9 9.2 8.4 4.6 9.5 7.4 6.9 9.2 8.4 4.6 9.5 7.4 6.9 9.2 8.4 4.6 9.5 8.8 8.0 7.4 6.9 9.2 8.4 4.6 9.5 8.8 8.0 7.4 6.9 9.2 8.4 4.6 9.5 8.8 8.0 7.4 6.9 9.2 8.4 4.6 9.5 8.8 8.0 7.4 6.9 9.2 8.4 4.6 9.5 8.8 8.0 7.4 6.9 9.2 8.4 4.6 9.5 8.8 8.0 7.4 6.9 9.2 8.4 4.5 9.5 8.8 8.0 7.4 6.9 9.2 8.4 4.5 9.5 8.8 8.0 7.4 6.9 9.2 8.4 4.5 9.5 5.2 5.0 4.8 8.0 7.4 6.9 9.2 8.4 4.5 9.5 5.2 5.0 4.8 8.0 7.4 6.9 9.2 8.4 4.5 9.5 5.2 5.0 4.8 8.0 7.4 6.9 9.2 8.4 4.5 60 6.8 6.3 5.8 5.4 5.5 5.2 5.0 4.8 8.0 7.4 6.9 6.9 6.4 6.0 6.7 6.9 6.7 6.9 6.9 6.2 5.7 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9   |             |        |            |           |            | 1 1         |        |            |         |     |
| 65   |             |        |            |           |            |             | 75     | 5.1        | 4.9     | 4.7 |
| 70   |             |        |            |           |            |             | 35     | 9,9        | 8.8     | 8.0 |
| 15   | H -         |        |            |           |            |             | 40     | 9.4        | 8.5     |     |
| 15 13.9 12.3 11.0 20 13.3 11.8 10.5 25 12.6 11.2 10.1 30 11.9 10.6 9.5 35 11.2 10.0 9.0 40 10.4 9.4 8.5 55 7.5 5.0 4.8 4.6 10.5 40 10.4 9.4 8.5 55 8.2 7.6 7.0 6.5 6.8 8.2 7.6 7.0 6.5 6.8 8.2 7.6 6.0 60 7.5 6.0 65 6.4 5.9 5.5 7.5 5.2 5.0 4.8 10.1 25 10.1  |             |        |            |           |            | 1 1         |        |            |         |     |
| 20 13.3 11.8 10.5 210.1 20.1 1.9 10.6 9.5 6.1 2.6 11.2 10.0 9.0 40 11.9 10.6 9.5 55 11.2 10.0 9.0 9.0 40 10.4 9.4 8.5 55 8.2 7.6 7.0 6.5 6.8 8.2 7.6 7.0 6.5 6.8 6.4 6.0 6.5 6.4 5.9 5.5 7.5 5.2 5.0 4.8 4.6 60 7.0 6.4 6.0 60 7.0 6.4 6.0 60 7.0 6.4 6.0 60 7.0 6.4 6.0 65 6.4 5.9 5.5 7.5 5.0 11.6 10.9 9.2 8.4 4.6 10.2 9.2 8.4 4.5 60 6.8 6.3 5.8 6.5 6.6 6.7 6.3 5.9 70 5.6 5.3 5.8 5.4 70 5.6 5.2 4.9 4.7 4.5 6.5 6.7 6.3 5.9 70 5.6 5.3 5.0 4.8 10.1 9.0 9.1 8.2 6.5 6.5 6.7 6.3 5.9 70 5.5 5.2 4.9 4.7 4.5 6.5 6.0 6.0 6.5 5.9 5.5 5.2 4.9 9.4 6.5 6.2 5.7 6.0 6.0 6.5 5.9 5.5 5.2 4.9 9.4 6.5 6.2 5.7 5.9 5.6 5.9 5.9 5.0 4.9 4.7 4.5 4.2 4.0 70 70 44.6 4.4 4.2 4.0 70 70 44.6 4.4 4.2 4.0 70 70 44.6 4.4 4.2 4.0 70 70 44.6 4.4 4.2 4.0 70 70 44.6 4.4 4.2 4.0 70 70 44.6 4.4 4.2 4.0 70 70 44.6 4.4 4.2 4.0 70 70 44.6 4.4 4.2 4.0 70 70 44.6 4.4 4.2 4.0 70 70 44.6 4.4 4.2 4.0 70 70 44.6 4.4 4.2 4.0 70 70 70 44.6 4.4 4.2 4.0 70 70 70 44.6 4.4 4.2 4.0 70 70 70 44.6 4.4 4.2 4.0 70 70 70 44.6 4.4 4.2 4.0 70 70 70 44.6 4.4 4.2 4.0 70 70 70 44.6 4.4 4.2 4.0 70 70 70 44.6 4.4 4.2 4.0 70 70 70 44.6 4.4 4.2 4. | [           |        |            |           |            |             |        |            |         |     |
| 15   |             |        |            |           |            | 35          |        | 7.7        |         |     |
| 15   11.9   10.6   9.5   11.2   10.0   9.9   40   10.4   9.4   8.5   50   8.9   8.2   7.5   55   8.2   7.6   7.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.8   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   6.4   6.0   6.5   | ,           |        |            |           |            | 1 1         |        |            |         |     |
| 15   |             |        |            |           |            | 1 1         |        |            |         |     |
| 15   |             |        |            |           |            |             |        |            |         |     |
| 15   | -           |        |            |           |            |             |        |            |         |     |
| 50 8.9 8,2 7,6 7.0 6.5 6.8 8.2 7.4 6.8 6.8 6.0 7.5 7.0 6.0 5.7 7.0 6.5 5.2 5.0 4.8 25 5.0 4.8 25 7.4 6.7 7.5 5.2 5.0 4.8 25 7.4 6.7 7.5 5.2 5.0 4.8 25 7.4 6.7 7.5 5.2 5.0 4.8 25 7.4 6.7 7.5 5.2 5.0 4.8 25 7.4 6.7 7.5 5.2 5.0 4.8 25 7.4 6.7 7.5 5.2 5.0 4.8 25 7.4 6.7 7.5 5.2 5.0 4.8 25 7.4 6.7 7.5 5.0 4.8 4.6 7.9 7.1 6.5 6.5 6.4 6.7 6.2 6.5 6.7 6.3 5.9 7.9 6.0 6.8 6.3 5.8 5.4 5.0 6.5 6.7 6.3 5.9 7.0 6.0 6.7 6.1 5.7 5.2 5.0 4.8 25 7.2 6.5 6.5 6.2 5.7 5.2 4.9 4.5 8.6 7.9 7.5 5.5 7.4 6.5 6.5 6.2 5.7 5.2 5.0 4.8 6.6 6.2 5.7 5.2 5.0 4.8 6.6 6.2 5.7 5.2 5.0 4.8 6.6 6.2 5.7 5.2 5.0 4.8 6.6 6.2 5.7 5.2 5.0 4.8 6.6 6.2 5.7 5.2 5.0 4.8 6.6 6.2 5.7 5.2 5.0 4.8 6.6 6.2 5.7 5.2 5.0 4.8 6.6 6.2 5.7 5.2 5.0 4.8 6.6 6.2 5.7 5.2 5.0 5.0 5.0 5.5 5.2 4.9 4.5 6.5 6.0 6.5 5.9 5.5 5.2 4.9 4.5 6.5 6.0 6.5 5.9 5.5 5.2 4.9 4.5 6.5 6.0 6.5 5.9 5.5 5.2 4.9 4.5 6.5 6.2 5.9 5.5 5.2 4.9 4.5 6.5 6.2 5.9 5.5 5.2 4.9 4.5 6.5 6.2 5.9 5.5 5.2 4.9 4.9 4.6 4.4 4.2 4.9 6.5 6.5 6.9 6.2 5.7 5.9 5.5 6.9 6.9 6.2 5.7 5.9 5.5 5.2 4.9 4.9 4.6 4.4 4.2 4.9 7.5 4.6 4.4 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.7 5.1 4.2 4.0 7.0 7.7 5.1 4.2 4.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7 | 15          |        |            |           |            | 1 1         |        |            |         |     |
| 60       7.5       7.0       6.5       6.6       6.6       6.4       6.0         70       6.0       5.7       7.0       6.5       6.6       6.7       7.0       6.4       6.0         70       6.0       5.7       5.4       6.0       6.5       6.4       5.9       5.5         75       5.2       5.0       4.8       9.7       70       5.7       5.4       5.1         20       12.8       11.3       10.1       9.7       70       5.7       5.4       4.6         30       11.6       10.3       9.2       8.8       8.8       7.9       7.1       6.5         35       10.9       9.8       8.8       8.4       45       60       6.8       6.3       5.8         40       10.2       9.2       8.4       45       60       6.8       6.3       5.8       5.4         50       8.8       8.0       7.9       7.4       6.7       6.2       6.3       5.8       5.4         60       7.4       6.9       6.4       5.9       7.6       6.8       6.2         70       5.6       6.7       6.3       5.9  | 1           | 50     | 8.9        | 8,2       | 7.5        |             |        |            |         |     |
| 65       6,8       6,4       6,0       6,0       6,0       6,0       5,7       5,4       5,5       70       5,7       5,4       5,5       70       5,7       5,4       5,5       70       5,7       5,4       5,1       70       5,7       5,4       5,1       70       5,7       5,4       5,1       70       5,7       5,4       5,1       70       5,7       5,4       5,1       70       5,7       5,4       5,1       7,4       6,7       6,7       6,7       6,7       6,7       6,7       6,7       6,7       6,7       6,7       6,7       6,2       7,4       6,7       6,2       6,7       6,2       6,7       6,2       5,2       5,3       5,8       5,4       6,7       6,3       5,8       5,4       7,4       6,7       6,2       6,7       6,2       6,7       6,3       5,8       5,4       7,4       6,7       6,3       5,8       5,4       7,4       6,7       6,2       5,2       5,6       7,4       6,7       6,2       5,2       5,3       5,8       5,4       7,4       6,7       6,2       5,2       5,3       5,9       7,6       6,3       5,8       5,4       7,0   | 1           |        |            |           |            | 40          |        |            |         |     |
| 70         6.0         5.7         5.4         6.0         5.7         5.4         5.5         5.7         5.5         5.5         5.5         5.6         6.4         5.9         5.5         5.5         5.5         5.7         5.0         4.8         4.6         5.1         5.2   |             |        |            |           |            | 70          |        |            |         |     |
| 75   5.2   5.0   3.7   3.4   70   5.7   5.4   4.8   4.6    20   12.8   11.3   10.1   25   12.2   10.8   9.7   30   11.6   10.3   9.2   40   10.2   9.2   8.4   45   60   6.8   6.3   5.8   5.4   40   10.2   9.2   8.4   45   65   6.3   5.8   5.4   5.0   6.5   6.3   5.8   5.4   5.0   6.6   6.3   5.8   5.4   5.0   6.0   6.7   6.3   5.9   5.0   6.0   6.7   6.1   5.7   5.2   5.0   4.8   4.6   4.4   4.2   4.0    20   45   9.5   8.6   7.9   7.5   6.9   6.4   65   6.7   6.3   5.9   5.6   6.7   6.3   5.9   5.0   60   6.7   6.1   5.7   5.2   5.0   4.8   5.0   60   6.7   6.1   5.7   5.2   5.0   4.8   4.6   4.4   4.2   4.0    25   11.8   10.5   9.4   8.5   7.8   7.3   5.5   6.9   6.2   5.7   5.2   4.9   4.5   6.5   6.0   5.6   5.2   5.7   5.5   6.0   5.6   5.2   5.7   5.5   6.0   6.5   5.9   5.5   5.2   4.9   4.6   4.4   4.2   4.0    26   70   70   70   4.6   4.4   4.2   4.0   7.5   4.6   4.4   4.2   4.0    27   17   10.8   10.1   9.0   9.1   8.2   60   6.5   5.7   5.3   4.9   4.6   4.4   4.2   4.0    28   17   18   10.5   9.4   7.5   6.5   6.0   5.6   5.2   5.7   5.3   4.9   4.6   4.4   4.2   4.0    29   18   18   10.5   9.4   7.5   6.6   6.5   5.7   5.3   4.9   4.6   4.4   4.2   4.0    20   10.0   9.1   8.2   60   6.5   5.9   5.5   5.2   4.9   4.6   4.4   4.2   4.0    29   10.0   9.1   8.2   60   6.5   5.9   5.5   5.2   4.9   4.6   4.4   4.2   4.0    20   10.0   9.1   8.2   60   6.5   5.7   5.3   4.9   4.6   4.4   4.2   4.0    20   10.0   9.1   8.2   60   6.5   5.7   5.3   4.9   4.6   4.4   4.2   4.0    20   10.0   9.1   8.2   6.5   6.5   6.0   6.5   5.9   5.5   5.2   5.0   6.0   6.5   5.9   5.5   5.2   5.0   6.0   6.5   5.9   5.5   5.2   5.0   6.0   6.5   5.9   5.5   5.2   5.0   6.0   6.5   5.9   5.5   5.2   5.0   6.0   6.5   5.9   5.5   5.2   5.0   6.0   6.5   5.9   5.5   5.2   5.0   6.0   6.5   5.9   5.5   5.0   6.0   6.5   5.9   5.5   5.0   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6.0   6.5   6 |             |        |            |           |            | 1           |        |            |         |     |
| 20   |             |        |            |           |            | 1 1         | 70     | 5.7        |         | 5.1 |
| 25   |             |        |            |           |            | ]           | 75     | 5.0        | 4.8     | 4.6 |
| 20   11.6   10.8   9.2   3.5   10.9   9.8   8.8   40   10.2   9.2   8.4   45   60   6.8   6.3   5.8   6.2   6.5    |             |        |            |           |            |             | 4.5    | 8.3        | 7.4     | 6.7 |
| 20   10,9   9.8   8.8   45   60   6.8   6.3   5.8   5.4   5.5   6.5   6.5   6.5   5.3   5.0   6.5   6. |             |        |            |           |            | 1 1         |        |            |         |     |
| 20       40<br>45<br>45<br>50<br>8,8<br>8,8<br>8,0<br>7,4<br>65<br>60<br>70<br>70<br>60<br>70<br>60<br>70<br>60<br>70<br>60<br>70<br>60<br>70<br>60<br>70<br>60<br>70<br>70<br>60<br>70<br>70<br>60<br>70<br>70<br>60<br>70<br>70<br>60<br>70<br>70<br>60<br>70<br>70<br>60<br>70<br>70<br>70<br>70<br>70<br>60<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70<br>70  | 1           |        |            |           |            |             |        |            |         |     |
| 20       45       9.5       8,6       7.9       7.9       70       5.6       5.3       5.8       5.0       5.6       5.3       5.6       5.3       5.0       5.6       5.3       5.0       5.0       5.6       5.3       5.0       5.0       5.6       5.3       5.0       5.0       5.0       5.6       5.3       5.0       5.0       5.0       5.0       5.0       5.0       5.0       5.0       5.0       5.0       5.0       5.0       6.0       6.7       6.5       6.0       6.2       6.5       6.0       6.5       6.0       6.5       6.0       6.5       6.0       6.5       6.0       6.5       6.0       6.5       6.0       6.5       6.0       6.2       5.7       5.3       4.9       4.4       4.4       4.2       4.9       4.6       4.4       4.4       4.2       4.6       4.4       4.4       4.2       4.6       4.4       4.4       4.2       4.6       4.4       4.2       4.6       4.4       4.2       4.6       4.4       4.2       4.6       4.4       4.2       4.5       4.8       7.5       7.7       7.5       4.6       6.2       5.7       5.5       6.9       6.2<  |             |        |            |           |            | 45          |        |            |         |     |
| 50         8,8         8.0         7.4         70         4.9         4.7         4.5           60         7.4         6.9         6.4         50         7.6         4.9         4.7         4.5           65         6.7         6.9         6.4         50         7.2         6.5         6.0           70         6.0         5.7         5.4         50         60         6.7         6.1         5.7           75         5.2         5.0         4.8         7.5         6.2         5.7         5.3           25         11.8         10.5         9.4         8.6         7.5         4.8         4.6         4.4           35         10.7         9.6         8.6         5.7         5.2         4.9         4.6         4.4           45         9.4         8.5         7.8         5.5         6.9         6.2         5.7         5.5           45         9.4         8.5         7.8         7.8         7.5         6.0         5.5         5.9         5.5           55         8.0         7.4         6.8         6.3         6.3         6.9         6.2         5.7         5.3  | 20          |        |            |           |            | ) i         |        |            |         |     |
| 55 8.1 7.5 6.9 6.4 50 7.4 6.9 6.4 5.5 7.2 6.5 8.0 6.5 6.7 6.3 5.9 5.4 5.0 4.8 55 7.2 6.5 5.2 4.9 4.6 4.4 4.2 4.0 75 4.2 4.0 75 4.2 4.0 5.9   |             |        |            |           |            | 1 4         |        |            |         |     |
| 65 6.7 6.3 5.9 70 6.0 5.7 5.4 5.0 60 6.7 6.1 5.7 5.3 3.0 11.8 10.5 9.4 75 4.8 4.6 4.4 1.2 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5  |             |        |            |           |            |             | 75     | 4.9        | 4.7     | 4.5 |
| 70         6.0         5.7         5.4         50         60         6.7         6.1         5.7         5.3           25         11.8         10.5         9.4         70         5.5         5.2         4.9         4.9           35         10.7         9.6         8.6         6.8         6.8         6.8         4.8         4.6         4.4           45         9.4         8.5         7.8         55         65         6.0         5.6         5.9         5.5           55         8.0         7.4         6.8         7.3         6.8         6.3         6   |             |        |            |           |            | 1           |        |            | 6.8     |     |
| 75         5.2         5.0         4.8           25         11.8         10.5         9.4           30         11.3         10.1         9.0           35         10.7         9.6         8.6           40         10.0         9.1         8.2           45         9.4         8.5         7.8           55         8.0         7.4         6.8           60         7.3         6.8         6.3           60         7.3         6.8         6.3           65         6.6         6.2         5.8           70         5.9         5.6         5.3           70         5.9         5.6         5.3           65         6.6         6.2         5.8           70         5.9         5.6         5.3           65         6.6         6.2         5.8           70         5.9         5.6         5.3           60         6.5         5.7         5.3           4.9         4.7         4.6         4.4           4.9         4.6         4.4           4.9         4.6         4.4           4.9   |             |        |            |           |            | 1 1         |        |            |         |     |
| 25   | 1           |        |            |           |            | 50          |        |            |         |     |
| 25   11.8   10.5   9.4   9.0   75   4.8   4.6   4.4   4.2   4.0   75   4.8   4.6   4.4   4.2   4.0   75   4.8   4.6   4.4   4.2   4.0   75   4.8   4.6   4.4   4.2   4.0   75   4.8   4.6   4.4   4.2   4.0   75   4.2   4.0   5.9   5.9   5.9   5.9   5.9   4.7   4.6   4.4   4.2   4.0   75   4.2   4.0   5.9   5.9   5.9   4.7   4.6   4.4   4.2   4.0   75   4.2   4.0   5.9   |             |        | 3.Z        |           | 7.0        |             |        |            |         |     |
| 25   10.7   9.6   8.6   5.5   6.9   6.2   5.7   40   10.0   9.1   8.2   5.5   6.0   6.5   5.9   45   9.4   8.5   7.8   7.8   50   8.7   7.9   7.3   6.8   6.3   6.5   6.6   6.2   70   7.3   6.8   6.3   65   6.6   6.2   5.8   70   5.9   5.6   5.3   75   5.1   4.9   4.7      10.0   9.6   8.6   8.6   6.5   6.9   6.2   70   5.4   5.1   75   4.7   4.5   75   4.7   4.5   76   65   5.7   77   70   70   4.6   78   4.2   4.0   79   70   70   4.6   70   70   70   70   70   4.6   70   70   70   70   70   70   70   70   |             |        |            |           |            | 1 .         |        |            |         |     |
| 25   |             |        |            |           |            | <u> </u>    |        |            |         |     |
| 25   45   9.4   8.5   7.8   55   65   6.0   5.6   5.2   50   8.7   7.9   7.3   6.8   7.5   4.7   4.5   4.3   60   7.3   6.8   6.3   6.5   6.6   6.2   70   5.9   5.6   5.3   75   5.1   4.9   4.7  | ļ ·         |        |            |           |            | <b>,</b>    |        |            |         |     |
| 25   50   8.7   7.9   7.3   6.8   7.5   4.7   4.5   4.8   6.8   6.3   6.6   6.6   6.2   5.8   5.3   6.8   6.5   5.7   5.3   4.9   4.6   4.4   4.2   4.0   75   4.2   4.0   5.9   5.9   5.6   5.9   6.5   70   70   70   4.6   4.4   4.2   4.0   7.5   4.6   4.4   4.2   4.0   7.5   4.2   4.0   5.9  | 1           |        |            |           |            | ا ہے ا      |        |            |         |     |
| 55     8.0     7.4     6.8     75     4.7     4.5     4.3       65     6.6     6.2     5.8     5.8     60     6.1     5.6     5.2       70     5.9     5.6     5.8     5.8     60     65     5.7     5.3     4.9       4.7     4.6     4.4     4.2       65     5.4     5.0     4.7       65     70     4.9     4.6     4.4       75     4.4     4.2     4.0       70     70     4.6     4.4     4.2       4.0     7.5     4.2     4.0     3.9   | 25          |        |            |           |            | 35          |        |            |         |     |
| 60 7.3 6.8 6.2 5.8 5.8 70 5.9 5.6 5.3 4.9 4.6 4.4 4.2 4.0 75 4.6 4.4 4.2 4.0 75 4.6 4.4 4.2 4.0 75 4.6 4.4 4.2 4.0 75 4.6 4.4 4.2 4.0 75 4.6 4.4 4.2 3.9   |             |        |            |           |            | [           |        |            |         |     |
| 65   |             | 60     |            | 6.8       | 6.3        |             |        |            |         |     |
| 75 5.1 4.9 4.7 70 70 5.2 4.9 4.6 4.4 4.2 65 70 4.9 4.6 4.4 4.2 65 70 4.9 4.6 4.4 4.2 4.0 75 4.4 4.2 4.0 75 4.4 4.2 4.0 75 4.2 4.0 5.9  |             |        |            |           |            | 1           |        |            |         |     |
| 75 4.6 4.4 4.2<br>65 5.4 5.0 4.7<br>70 70 4.9 4.6 4.4<br>75 4.4 4.2 4.0<br>70 70 4.6 4.4 4.2<br>70 75 4.2 4.0 5.9  |             |        |            |           |            | 60          |        |            |         |     |
| 65 70 4.9 4.6 4.4 4.2 4.0 75 4.2 4.0 8.9   |             | 75     | 5.1        | 4.9       | 4.7        | .           |        |            |         |     |
| 70 70 4.9 4.6 4.4 4.0 75 4.6 4.4 4.2 4.0 75 4.2 4.0 5.9  | 1           |        | 1          |           |            | <del></del> |        |            |         |     |
| 75 4.4 4.2 4.0<br>70 70 4.6 4.4 4.2<br>75 4.2 4.0 8.9  |             |        |            |           |            |             |        |            |         |     |
| 70 70 4.6 4.4 4.2<br>75 4.2 4.0 S.9  |             |        | ì          |           |            | 65          |        |            |         |     |
| 75 4.2 4.0 8.9   |             |        | -          |           | .          |             |        |            |         |     |
| 75 4.2 4.0 3.9   |             |        |            |           |            | 70          |        |            |         |     |
| 75 75 3.8 3.7 3.6  |             |        |            |           |            |             | 75     | 4.2        | 4.0     | 8.9 |
|  |             |        |            |           |            | 75          | 75     | 3.8        | 3.7     | 3.6 |
|  | i           |        | 1          |           |            | [           |        | 1          |         | I   |
|  | <del></del> | ·      |            |           |            |             |        |            | ·····   |     |

TABLE LXVIII.

VALUE OF AN ANNUITY ON THE LONGEST OF TWO GIVEN LIVES.

| Age of     | Age of the Value, or year's purchase at                                    |  |  |  | Age of the   Value, or year's purchase a rounger   Elder.   3 p. cent.   4 p. cent.   5 per ce |  |  |  | urchase at   |
|------------|--|--|--|--|--|--|--|--|--|
| onnger.    | Elder.   | 3 p. cent.   | 4 p. cent.   | 5 p. cent.   | founger.   | Elder.   | 3 p. cent.   | 4 p. cent.   |  |
| 10         | 10<br>15<br>20<br>25<br>30<br>35<br>40<br>45<br>50<br>55<br>60<br>65<br>70 | 23.4<br>22.9<br>22.5<br>22.2<br>21.9<br>21.6<br>21.4<br>21.2<br>20.9<br>20.7<br>20.4<br>20.1<br>19.8<br>19.5 | 19.9<br>19.5<br>19.1<br>18.8<br>18.6<br>18.4<br>18.3<br>18.2<br>18.0<br>17.8<br>17.6<br>17.4<br>17.2<br>16.9 | 17.1<br>16.8<br>16.6<br>16.4<br>16.2<br>16.1<br>16.0<br>15.9<br>15.8<br>15.7<br>15.5<br>15.3<br>15.1<br>14.8 | 30   | 30<br>35<br>40<br>45<br>50<br>55<br>60<br>65<br>70<br>75<br>35<br>40<br>45 | 19.3<br>18.8<br>18.4<br>18.1<br>17.8<br>17.4<br>17.0<br>16.6<br>16.1<br>15.6<br>18.3<br>17.3<br>17.4 | 16.6<br>16.2<br>15.9<br>15.6<br>15.4<br>15.1<br>14.8<br>14.5<br>14.1<br>13.7 | 14.5<br>14.2<br>14.0<br>13.8<br>13.6<br>13.4<br>13.2<br>12.9<br>12.6<br>12.2 |
|            | 15<br>20<br>25<br>30<br>35   | 22.8<br>22.3<br>21.9<br>21.6<br>21.3   | 19.3<br>18.9<br>18.6<br>18.3<br>18.1   | 16.7<br>16.4<br>16.2<br>16.0<br>15.9   | 35   | 50<br>55<br>60<br>65<br>70<br>75   | 17.1<br>16.7<br>16.3<br>15.8<br>15.3<br>14.8   | 14.8<br>14.5<br>14.2<br>13.8<br>13.4<br>13.0                                 | 13.1<br>12.9<br>12.7<br>12.4<br>12.0<br>11.6                                 |
| 1 <i>5</i> | 40<br>45<br>50<br>55<br>60<br>65<br>70                                     | 21.1<br>20.9<br>20.7<br>20.4<br>20.1<br>19.8<br>19.4<br>18.9   | 17.9<br>17.8<br>17.6<br>17.4<br>17.2<br>16.9<br>16.6<br>16.3   | 15.7<br>15.6<br>15.4<br>15.3<br>15.2<br>15.0<br>14.7<br>14.4   | 40   | 40<br>45<br>50<br>55<br>60<br>65<br>70<br>75                               | 17.3<br>16.8<br>16.3<br>15.9<br>15.4<br>14.9<br>14.5<br>14.0   | 15.0<br>14.6<br>14.0<br>13.9<br>13.5<br>13.1<br>12.7<br>12.3                 | 13.3<br>13.0<br>12.7<br>12.4<br>12.1<br>11.8<br>11.4<br>11.0                 |
| 20         | 20<br>25<br>30<br>35<br>40<br>45<br>50                                     | 21.1<br>20.7<br>20.4<br>20.1<br>19.9<br>19.6<br>19.4   | 18.3<br>,17.9<br>17.6<br>17.4<br>17.2<br>17.0<br>16.8<br>16.6  | 15.8<br>15.5<br>15.3<br>15.1<br>15.0<br>14.9<br>14.7   | . 45   | 45<br>50<br>55<br>60<br>65<br>70<br>75                                     | 16.2<br>15.7<br>15.2<br>14.7<br>14.1<br>13.6<br>13.1   | 14.2<br>13.8<br>13.4<br>12.9<br>12.5<br>12.0<br>11.6                         | 12.8<br>12.5<br>12.1<br>11.7<br>11.4<br>11.0<br>10.6                         |
|            | 60<br>65<br>70<br>75   | 19.1<br>18.7<br>18.2<br>17.7   | 16.3<br>16.0<br>15.7<br>15.3   | 14.3<br>14.1<br>13.8<br>13.5   | 50   | 50<br>55<br>60<br>65<br>70   | 15.0<br>14.5<br>13.9<br>13.3<br>12.8   | 13.3<br>12.9<br>12.4<br>12.0<br>11.5   | 12.1<br>11.7<br>11.3<br>10.9<br>10.5   |
| 25         | 30<br>35<br>40<br>45<br>50<br>55   | 19.8<br>19.4<br>19.2<br>18.9<br>18.7<br>18.4   | 17.0<br>16.7<br>16.5<br>16.3<br>16.1<br>15.9   | 14.9<br>14.7<br>14.5<br>14.8<br>14.2<br>14.0   | 55   | 75<br>55<br>60<br>65<br>70<br>75   | 12.3<br>13.6<br>13.0<br>12.4<br>11.8<br>11.3   | 11.0<br>12.4<br>11.9<br>11.3<br>10.8<br>10.3                                 | 10.1<br>11.3<br>10.9<br>10.5<br>10.0<br>9.5                                  |
|            | 60<br>65<br>70<br>75   | 18.0<br>17.6<br>17.2<br>16.7   | 15.6<br>15.3<br>15.0<br>14.6   | 15.8<br>13.6<br>13.3<br>12.9   | 60   | 60<br>65<br>70<br>75   | 12.2<br>11.5<br>10.9<br>10.3   | 11.2<br>10.6<br>10.1<br>9.5  | 10.5<br>10.0<br>9.5<br>9.0   |
|            |  |  | F.'  | ,  | 65   | 65<br>70<br>75   | 10.7<br>10.0<br>9.3  | 10.0<br>9.4<br>8.7   | 9.4<br>8.9<br>8.3  |
|            |  | -  |  |  | 70   | 70<br>75   | 9.2<br>8.4   | 8.6<br>7.9   | 8.2<br>7.6   |
|            |  |  | -  | •  | 75   | 75   | 7.6  | 7.2  | 6.9  |
|            |  | I  |  |  | II.  |  | · .  |  |  |

| _       | Color by the Color | -               |             |         |                     |        |                       |
|---------|--------------------|-----------------|-------------|---------|---------------------|--------|-----------------------|
| TO REI  | TABLE              |                 | NS TO FEET. | TO RE   | TABLE<br>DUCE SCOTE |        |                       |
| Chains. | Feet.              | Links.          | Feet.       | Chains. | Feet.               | Links. | Feet.                 |
| 1       | 66.00              | 1               | 0.66        | 1       | 74.40               | 1      | .74                   |
| 2       | 132.00             | 2               | 1.32        | 2       | 148.80              | 2      | 1.49                  |
| 3       | 198.00             | 3               | 1.98        | 2 3     | 223.20              | 3      | 2.23                  |
| 4       | 264.00             | 4               | 2.64        | 4       | 297.60              | 4      | 2.98                  |
| 5       | 380.00             | 5               | • 3.30      | 5       | 372.00              | 5      | 3.72                  |
| 6       | 396.00             | ٠ 6             | 3.96        | 6       | 446.40              | 6      | 4.46                  |
| 7       | 462.00             | 7               | 4.62        | 7       | 520.80              | - 7    | 5.21                  |
| 8       | 528.00             | 8               | 5.28        | 8       | 595.20              | 8      | 5.9 <b>5</b>          |
| 9       | 594.00             | 9               | 5.94        | 9       | 669.60              | 9      | 6.70                  |
| 10      | 660.00             | 10              | 6.60        | 10      | 744.00              | 10     | 7.44                  |
| 20      | 1320.00            | 15              | 9.90        | 20      | 1488.00             | 15     | 11.16                 |
| . 30    | 1980.00            | 20              | 13.20       | 30      | 2232.00             | 20     | 14.88                 |
| 40      | 2640.00            | 30              | 19.80       | 40      | 2976.00             | 80     | 22.32                 |
| 50      | . 3300.00          | 40              | 26.40       | 50      | 3720.00             | 40     | 29.76                 |
| 60      | 3960.00            | <i>5</i> 0      | 33.00       | 60      | 4464.00             | 50     | 37.20                 |
| 70      | 4620.00            | 60              | 39.60       | 70,     | 5208.00             | 60     | 44.64                 |
| 80      | 5280.00            | 70              | 46.20       | 80      | 5952.00             | 70     | 52.08                 |
| ′ 90    | 5940.00            | <sup>′</sup> 80 | 52.80       | 90      | 6696.00             | 80 /   | <b>5</b> 9. <b>52</b> |
| 100     | 6600 00            | 90              | 59.40       | 100     | 7440,00             | 90     | 66.95                 |
| 200     | 13200.00           | 100             | 66.00       | 200     | 14880.00            | 100    | 74.40                 |
|         | TABLE              | LXXI            |             |         | TABLE               | LXXII  | •                     |

### TO REDUCE ENGLISH TO SCOTS ACRES. TO REDUCE SCOTS TO ENGLISH ACRE Scots Acres. IE. R. & P. Scots Rds. &c. S. Acres. English Acres. S. R. & F. Eng. Rds. & E. Acres. 03 5.9 Roods. 1.1 3.3 Roods. 1 2 11.8 2 1 0 0 31.5 9 2 2 6.6 1 0 1 10.8 0 1 23.0 0 2 11.7 3 2 1 17.7 2 3 3 3 10.0 2 4 3 0 23.6 3 0 2 14.4 4 5 0 13.3 3 0 3 32.5 5 3 3 29.5 Poles. 5 6 1 16.6 Fails. 6 4 2 35.5 1 00 0.8 6 7 2 19.9 0 0 1.3 1 7 52 2 7 8 3 23.2 1.4 0 0 1.6 2 00 2.5 8 6 1 7.3 3 0 0 8 10 0 26.6 3 00 3.8 2.4 9 7 0 13.2 4 3.1 9 11 1 29.9 4 00 5.1 0 0 10 7 3 19.1 5∙ 10 12 2 33.2 5 0 0 00 6.4 3.9 15 2 38.2 20 6 20 25 1 26.4 0 0 7.6 00 4.7 6 30 23 2 17.3 5.**5** 7 00 30 38 0 19.6 7 0 0 8.9 31 1 36.4 40 8 00 6.3 40 50 3 12.8 8 0 0 10.2 50 39 1 15.5 63 2 5.9 9 50 9 0011.4 0 0 7.1 60 47 0 34.6 10 60 76 0 89.1 10 0 0 12.7 00 7.9 70 55 O 13.7 15 0 0 11.8 70 88 3 32.3 15 0 0 19.1 0 0 15.7 80 62 3 32.8 20 80 101 2 25.5 20 0 0 25.4 90 70 3 12.0 25 0 0 19.7 90. 114 1 18.7 25 0.0 31.8

# TABLE LXXIII. TO REDUCE A DISTANCE MEASURED ON AN INCLINED PLANE TO HORIZONTAL MEASURE.

100

200

127 0 11.9

254 0 23.8

30

35

0 0 38.1

0 0 4.5

0 0 23.6

0 0 27.5

100

200

78 2 31.1

157 1 22.1

30

35

| Angle. | Red.  | Angle. | Red.  | Angle. | Red.  | Angle.  | Red.  | Angle. | Red.  | Angle. | Red.  |
|--------|-------|--------|-------|--------|-------|---------|-------|--------|-------|--------|-------|
| 0020   | .0000 | 4°20/  | .0029 | 8°20′  | .0106 | 120 20/ | .0231 | 16°20′ | .0404 | 20°20' | .0623 |
| 0 40   | .0001 | 4 40   | .0033 | 8 40   | .0114 | 12 40   | .0243 | 16 40  | .0420 | 20 40  | .0643 |
| 1 0    | .0002 | 5 0    | .0038 | 9 0    | .0123 | 13 0    | .0256 | 17 0   | .0437 | 21 0   | .0664 |
| 1 20   | .0003 | 5 20   | .0043 | 9 20   | .0132 | 13 20   | .0270 | 17 20  | .0454 | 21 20  | .Q685 |
| 1 40   | .0004 | 5 40   | .0049 | 9 40   | .0142 | 13 40   | .0283 | 17 .40 | .0472 | 21 40  | .0707 |
| 2 0    | .0006 | 6 0    | .0055 | 10 0   | .0152 | 14 0    | .0297 | 18 0   | .0489 | 22 0   | .0728 |
| 2 20   | .0008 | 6 20   | .0061 | 10 20  | .0162 | 14 20   | .0311 | 18 20  | .0508 | 22 20  | .0750 |
| 2 40   | .0011 | 6 40   | .0068 | 10 40  | .0173 | 14 40   | .0326 | 18 40  | .0526 | 22 40  | .0772 |
| 3 0    | .0014 | 7 0    | .0075 | 11 0   | .0184 | 15 0    | .0341 | 19 ,0  | .0545 | 23 0   | .0795 |
| 3 20   | .0017 | 7 20   | .0082 | 11 20  | .0195 | 15 20   | .0356 | 19 20  | .0564 | 23 20  | .0818 |
| 3 40   | .0020 | 7 40   | .0089 | 11 40  | .0207 | 15 40   | .0372 | 19 40  | .0583 | 23 40  | .0841 |
| 4 0    | .0024 | 8 0    | .0097 | 12 0   | .0219 | 16 0    | .0387 | 20 0   | .0603 | 24 0   | .0865 |

TABLE LXXIV.

## ANGLES CORRESPONDING TO CHORDS, OR SUBTENSES, THE RADIUS BEING 100.

| ıd | Angle. | Chd.         | Angle. | Chd. | Angle.       | Chd. | Angle.        | Chd. | Angle.                                  | Chd. | Angle. | Chd. Angle | Chd.  | Angle           |
|----|--------|--------------|--------|------|--------------|------|---------------|------|---|------|--------|------------|-------|-----------------|
| 1  | 0934   | 19           | 10°54  | 37   | 21919        | 55   | 31°56'        | 73   | 42049                                   | 91   | 54° 8! | 109,66° 3  | 127   | 78° <i>5</i> 0′ |
| 2  | 1 9    | 20           | 11 29  | 38   | 21 54        | 56   | 32 31         | 74   | 43 26                                   | 92   | 54 46  | 110 66 44  | 128   | 79 35           |
| 3  | 1 43   | 21           | 12 3   | 39   | 22 29        | 57   | 38 7          | 75   | 44 3                                    | 93   | 55 25  | 111 67 20  | 129   | 80 20           |
| 4  | 2 18   | 22           | 12 38  | 40   | 23 4         | 58   | 83 43         | 76   | 44 40                                   | 94   | 56 4   | 112 68     | 130   | 81 <i>5</i>     |
| 5  | 2 52   | 23           | 13 12  | 41   | 23 40        | 59   | 34 19         | 77   | 45 17                                   | 95   | 56 43  | 11368 48   |       | :               |
| 6  | 3 26   | 24           | 13 47  | 42   | 24 15        | 60   | 34 55         | 78   | 45 54                                   | 96   | 57 22  | 114'69 30  |       |                 |
| 7  | 4 1    | 25           | 14 22  | 43   | 24 50        | 61   | 35 31         | 79   | 46 32                                   | 97   | 58 2   | 115,70 19  |       |                 |
| 8  | 4 35   | <b>2</b> 6 . | 14 56  | 44   | 25 25        | 62   | 36 7          | 80   | 47 10                                   | 98   | 58 41  | 11670 54   |       |                 |
| 9  | 5 10   | 27           | 15 31  | 45   | 26 0         | 63   | <b>3</b> 6 43 | 81   | 47 47                                   | 99   | 59 20  | 11771 30   |       | 84 54           |
| 0  | 5 44   | 28           | 16 6   | 46   | 26 36        | 64   | 37 20         | 82   | 48 25                                   | 100  | 60 0   | 11872 19   |       | 85 41           |
| 1  | 6 18   | 29           | 16 40  | 47   | 27 11        | 65   | 37 55         | 83   | 49 2                                    |      | 60 40  |            | 137   |                 |
| 2  | 6 53   | 30           | 17 15  | 48   | 27 46        | 66   | 38 32         | 84   | 1                                       | 102  | 61 20  | 12073 4    | -1 1  |                 |
| 3  | 7 27   | 31           | 17 50  | 49   | 28 22        | 67   | J9 9          | 85   | ~~                                      | 103  | 52 0   | 121 74 2   |       |                 |
| 4  | 8 2    | 32           | 18 25  | 50   | 28 57        | 68   | S9 45         |      | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | 104  | 62 40  | 122 75 1   |       |                 |
| 5  | 8 36   | 33           | 19 0   | 51   | 29 <b>33</b> | 69   | 40 22         | 87   |   | 105  | 63 20  | 123 75 5   |       |                 |
| 6  | 9 11   | 34           | 19 35  | ' 52 | 30 8         | 70   | 40 58         | 1    |   | 106  | 64 0   | 124 76 3   |       |                 |
| 7  | 9 45   | 35           | 20 10  | 53   | 30 44        | 71   | 41 35         | 89   | 52 51                                   | 107  | 64 41  | 125 77 2   |       |                 |
| 8  | 10 20  | 36           | 20 44  | 54   | 31 20        | 72   | 42 12         | 90   | 53 29                                   | 108  | 65 22  | 126 78     | 6 144 | 92 6            |

## TABLE LXXV.

## REDUCTION OF THE APPARENT TO THE TRUE LEVEL.

| ırt | l. 'I'he | dist. | being e | xpre | sed in | Ŀng.       | Chains. | Part | II. The | dist. | being e | xpres | sed in S | cots | Cha ns |
|-----|----------|-------|---------|------|--------|------------|---------|------|---------|-------|---------|-------|----------|------|--------|
| h.  | Red.     | Ch.   | Red.    | Ch.  | Red.   | Ch.        | Red.    | Ch.  | Red.    | Ch.   | Red.    | Ch.   | Red.     | Ch.  | Red.   |
| 1   | 0.00     | 14    | 0.24    | 27   | 0.91   | 40         | 2.00    | 1    | 0.00    | 14    | 0.31    | 27    | 1.16     | 40   | 2.54   |
| 2   | 0.00     | 15    | 0.28    | 28   | 0.98   | 45         | 2.53    | 2    | 0.00    | 15    | 0.36    | 28    | 1.25     | 45   | 3.22   |
| 3   | 0.01     | 16    | 0.32    | 29   | 1.05   | 50         | 3.12    | 8.   | 0.01    | 16    | 0.41    | 29    | 1.34     | 50   | 3.97   |
| 4   | 0.02     | 17    | 0.36    | SO   | 1.12   | 55         | 3.78    | 4    | 0.02    | 17    | Q. 46   | 30    | 1.43     | 55   | 4.81   |
| 5   | 0.03     | 18    | 0.40    | 31   | 1.19   | 60         | 4.50    | 5    | 0.04    | 18    | 0.51    | 31    | 1.53     | 60   | 5.72   |
| 6   | 0.04     | 19    | 0.45    | 32   | 1.27   | 6 <b>5</b> | 5.31    | 6    | 0.06    | 19    | 0.57    | 32    | 1.68     | 65   | 6.71   |
| 7   | 0.06     | 20    | 0.50    | 33   | 1.35   | 70         | 6.12    | 7    | D.08    | 20    | 0.63    | 33    | 1.73     | 70   | 7.79   |
| 8   | 0.08     | 21    | 0.55    | .34  | 1.44   | 75         | 7.03    | 8    | 0.10    | 21    | 0.70    | 34    | 1.84     | 75   | 8.94   |
| 9   | 0.10     | 22    | 0.60    | 35   | 1.53   | 80         | 8,00    | 9    | 0.13    | 22    | 0.77    | 35    | 1.95     | 80   | 10.17  |
| 10  | 0.12     | 23    | 0.66    | 36   | 1.62   | 85         | 9.03    | 10   | 0.16    | 23    | 0.84    | 36    | 2.06     | 85   | 11.48  |
| 11  | 0.15     | 24    | 9.72    | 57   | 1.71   | 90         | 10.12   | 11   | 0.19    | 24    | 0.91    | 37    | 2.18     | 90   | 12.87  |
| 12  | 0.18     | 25    | 0.78    | 38   | 1.80   | 95         | 11.28   | 12   | 0.23    | 25    | 0.99    | 38    | 2.29     | 95   | 14.34  |
| 13  | 0.21     | 26    | 0.84    | 39   | 1.90   | 100-       | 12.50   | 13   | 0.27    | 26    | 1.07    | 39    | 2.49     | 100  | 15.89  |

## TABLE LXXVI. PROPERTIES OF THE PLATONIC BODIES.

|             |                  | The side of body b | the Platonic<br>eing 1. | The diam of a Sphere being 1, the side of one of the Platonic bodies that |           |         |  |  |  |
|-------------|------------------|--------------------|-------------------------|---|-----------|---------|--|--|--|
| Name.       | No. of<br>Sides. | Surface.           |                         | may be inscrib.<br>in the Sphere,is                                       |           |         |  |  |  |
| Tetraedron  | 4                | 1.7320508          | 0.1178513               | 0.816497  | 2.44948   | 1.64417 |  |  |  |
| Hexaedron   | 6                | 6.0000000          | 1.0000000               | 0.577950  | 1.00000   | 0.88610 |  |  |  |
| Octaedron   | 8                | 3.464101 <b>6</b>  | 0.4714045               | 0.707107  | 1.22474   | 1.03576 |  |  |  |
| Dodecaedron | 12               | 20-6457788         | 7.6631189               | 0.525731  | . 0.66158 | 0.62153 |  |  |  |
| lcosaedron  | 20               | 8.6602510          | 2.1816950               | 0.356822  | 0.44903   | 0.40883 |  |  |  |

|                 | LE LXX<br>olygons, tl |           | TABLE LXXVIII. To reduce English to French Measure, and conversely. |                  |             |              |  |  |  |
|-----------------|-----------------------|-----------|---|------------------|-------------|--------------|--|--|--|
| Name.           | No. of sid            |           |   | Eng. to Fr. mea. |             |              |  |  |  |
| Equilat. trian. | 3                     | 0.4330127 | Eng. mea.   | French mea.      | French mea. | English mea. |  |  |  |
| Square          | 4                     | 1.0000000 | 1   | 0.938306         | 1           | 1.06575      |  |  |  |
| Pentagon -      | 5                     | 1.7204774 | 2   | 1.876612         | 2           | 2.13150      |  |  |  |

| Diquale     |           | 1.1000000  | -   | 1 0.000000 11 |    | 1.00010          |
|-------------|-----------|------------|-----|---------------|----|------------------|
| Pentagon -  | 5         | 1.7204774  | 2   | 1.876612      | 2  | 2.131 <i>5</i> 0 |
| Hexagon -   | 6         | 2.5980762  | 3   | 2.814916      | 3  | 3.19725          |
| Heptagon -  | 7         | 3.6339124  | 4   | 3.753224      | 41 | 4.26500          |
| Octagon -   | 8         | 4.8284271  | . 5 | 4.691530      | 5  | 5.32875          |
| Nonagon -   | <b>'9</b> | 6.1818242  | 6   | 5.629836      | 6  | 6.39450          |
| Decagon -   | 10 .      | 7.6942088  | 7   | 6.568142      | 7  | 7.46025          |
| Undecagon.  | 11        | 9.3656399  | 8   | 7.506448      | 8  | 8.52600          |
| Dodecagon - | 12        | 11.1961524 | 9   | 8.444754      | 9  | 9.59175          |
|             |           |            |     |               |    |                  |

## TABLE LXXIX.

## THE MEASURES OF THE PRINCIPAL LINES AND ANGLES IN REGULAR FORTRESSES, FROM FOUR TO TWELVE SIDES INCLUSIVE.

|                             | Names of Polygons. |        |              |        |        |        |        |         |          |
|-----------------------------|--------------------|--------|--------------|--------|--------|--------|--------|---------|----------|
| Names of Sides and Angles.  | Square             | Pentag | Hexag        | Hepta. | Octag. | Nonag. | Decag  | Undec.  | Dodeca.  |
| Exterior side, in toises -  | 180.               | 180.   | 180.         | 180.   | 180.   | 180.   | 180.   | 180.    | 180.     |
| Radius of exterior side -   | 127.3              | 153.1  | 180.0        | 207.4  | 235.2  | 263.1  | 291.2  | 319.4   | 347.7    |
| Interior side               | 115.3              | 123.9  | 130.6        | 136.2  | 140.0  | 142.9  | 144.9  | 146.3   |          |
| Radius of interior side -   | 81.7               | 105.4  | 130.6        | 157.0  | 183.0  | 208.9  | 233.4  | 259.7   | 286.1    |
| Capital                     | 45.6               | 47.7   | 49.3         | 50.5   | 52.2   | 54.2   | 57.8   | 59.7    | 61.7     |
| Normal                      | 22.5               | 27.0   | 30.0         | 32.0   | 34.0   | 36.0   | 39.0   | 41.0    | 43.0     |
| Curtin                      | 78.0               | 77.1   | 76.4         | 75.9   | 75.8   | 74.7   | 73.7   | 71.4    | 69.3     |
| Flank                       | 20.3               | 24.5   | 27.5         | 29.2   | 31.1   | 33.0   | \$5.8  | 37.0    | 38.1     |
| Face                        | 50.0               | 50.0   | <i>5</i> 0.0 | 50.0   | 50.0   | 50.0   | 50.0   | 51.0    | 52.0     |
| Line of Defence             | 133.0              | 134.2  | 135.1        | 185.8  | 136.4  | 137.2  | 138.2  | 138.2   | 138.2    |
| Demigorge                   | 18.7               | 23.4   | 27.1         | 30.2   | 32.4   | 34.1   | 35.8   | 37.4    | 39.4     |
| Angle of the Center -       | 90° 0              | 72° U  | 60° 0        | 51°26  | 45° 0' | 40° 0′ | 36° 0′ | 32°44   | 1 30° O' |
| Angle of the Polygon -      | 90 0               | 108 0  | 120 0        | 128 34 | 135 0  | 140 0  | 144 0  | '147 16 | 150 O    |
| Angle of the Curtin         | 97 1               | 98 21  | 99 19        | 99 47  | 100 21 | 100 54 | 101 43 | 102 15  | 102 46   |
| Angle of the Shoulder -     |                    | 115 3  | 117 39       | 119 21 | 121 8  | 122 42 | 125 9  | 126 45  | 128 18   |
| Ang. of Bast., or Hank. ang | 61 56              | 74 36  | 83 8         | 89 26  | 93 36  | 96 24  | 97 8   | 98 16   | 98 56    |
| Diminished Angle            | 14 2               | 16 42  | 18 26        | 19 34  | 20 42  | 21 48  | 23 26  | 24 30   | 25 32    |
| Exerior Flanking Angle -    | 151 56             | 146 36 | 143 8        | 140 59 | 138 36 | 136 24 | 133 8  | 131 0   | 128 56   |
| Breadth of Foss. in Toises  | 15                 | 15     | 18           | 20     | 20     | 20     | 21     | 22      | 23       |

## TABLE LXXX.

### TABLE LXXXI. TO REDUCE THE DIVISIONS OF THE 96 ARCH OF AN CLIMATES.

| 10   |           |      |            | 5 Ur Int 96 A  |                | CLIMATES.    |          |         |  |
|------|-----------|------|------------|----------------|----------------|--------------|----------|---------|--|
|      | ASTRON    | JMIC | 9          | Hour Climates. |                |              |          |         |  |
| prm. | . 1       | prm  |            | prm.           | Sub-Parts of a | Cli-   h. d. | Latitud. |         |  |
| Div. | Degrees.  | Div. | Degrees.   | Div. Degrees.  | div. Degree.   | mate end.    | of end.  | Breadt1 |  |
|      |           |      |            |                |                |              |          |         |  |
| 1    | 0°56′ 15″ | 37   | 34°41′ 15″ |                | Sub-dividing   | 1 12130      | 8034     | 8034    |  |
| . 2  | 1 52 30   |      | 35 37 30   | 74 69 22 30    | Scale.         | 2 13 0       | 16 44    | 8 10    |  |
| 3    | 2 48 45   |      | 36 93 45   | 75 70 18 45    | 1   0' 13".18  | 3 13 30      | 24 12    | 7 28    |  |
| 4    | 3 45 0    | 40   | 37 30 0    | 76 71 15 0     |                | 4 14 0       | 30 48    | 6 36    |  |
| 5    | 4 41 15   | 41   | 38 26 15   | 77 72 11 15    |                | 5 14 30      | 36 31    | 5 43    |  |
| 6    | 5 37 30   | 42   | 39 22 30   | 78 73 7 30     | 8 0 39.55      | 6 15 0       | 41 24    | 4 53    |  |
| 7    | 6 33 45   | 43   | 10 18 45   | 79 74 3 45     | 4 0 52.73      | 7 15 30      | 45 32    | 4 8     |  |
| 8    | 7 30 0    | 44   | 41 15 '0   | 80 75 0 0      | 5 1 5.92       | 8 16 0       | 49 2     | 8 30    |  |
| 9    | 8 26 15   | 45   | 42 11 15   | 81 75 56 15    | 6 1 19.10      | 9 16 30      | 52 0     | 2 58    |  |
| 10   | 9 22 30   | 46   | 13 7 30    | 82 76 52 30    | 7 1 32.28      | 10 17 0      | 54 81    | 2 31    |  |
| 11   | 10 18 45  | 47   | 14 9 45    | 83 77 48 45    | 8 1 45.47      | 11 17 30     | 56 38    | 2 7     |  |
| 12   | 11 15 0   | 48   | 45 0 0     | 84 78 45 0     | 9 1 58.65      | 12 18 0      | 58 27    | 1 49    |  |
| 13   | 12 11 15  | 49   | 45 56 15   | 85 79 41 15    | 10 2 11.84     | 13 18 30     | 60 0     | 1 33    |  |
| 14   | 13 7 30   | 50   | 46 52 30   | 86 80 87 30    | 11 2 25.02     | 14 19 0      | 61 19.   | 1 19    |  |
| 15   | 14 8 45   | 51   | 17 48 45   | 87 81 33 45    | 12 2 38.20     | 15 19 30     | 62 26    | 1 7     |  |
| 16   | 15 0 0    | 52   | 18 45 0    | 88 82 30 0     | 13 2 51.39     | 16 20 0      | 63 28    | 0 57    |  |
| 17   | 15 56 15  | 53   | 19 41 15   | 89 83 26 15    | 14 3 4.57      | 17 20 30     | 64 10    | 0 47    |  |
| 18   | 16 52 50  | 54   | 50 87 80   | 90 84 22 30    | 15 3 17.75     | 18 21 0      | 64 50    | 0 40    |  |
| 19   | 17 48 45  | 55   | 51 33 45   | 91 85 18 45    | 16 3 30.94     | 19 21 30     | 65 22    | 0 32    |  |
| 20   | 18 45 0   | 56   | 52 SO 0    | 92 86 15 0     | 17 3 44.12     | 20 29 0      | 65 48    | 0 26    |  |
| 21   | 19 41 15  | 57   | 58 26 15   | 93 87 11 15    | 18 3 57.30     | 21 22 30     | 66 7     | 0 19    |  |
| 22   | 20 37 30  | 58   | 54 22 30   | 94 88 7 30     | 19 4 10.49     | 22 23 0      | 66 21    | 0 14    |  |
| 23   | 21 33 45  | 59   | 55 18 45   | 95 89 3 45     | 20 4 23.67     | 23 23 30     | 66 29    | 0 8     |  |
| 24   | 22 30 0   | 60   | 56 15 0    | 96 90 0 0      | 21 4 36.85     | 24 24 0      | 66 32    | 0 8     |  |
| 25   | 23 26 15  | 61   | 57 11 15   | 11             | 22 4 50.04     |              |          |         |  |
| 26   | 24 22 30  | 62   | 58 7 30    | Sub-divisions. | 28 5 3.22      |              | h Climat | £8.     |  |
| 27   | 25 18 45  | 63   | 59 3 45    | Sub-Parts of a | 24 5 16.41     | No. Leng.    |          | 1       |  |
| 28   | 26 15 0   | 64   | 60 0 0     | div. Degree.   | 25   5 29.59   | of oflong.   | Lati-    | 1 .     |  |
| 29   | 27 11 15  | 65   | 60 56 15   | 1 7' 1".88     | 26 5 42.77     | Cli- day at  | tude at  | Breac   |  |
| 30   | 28 7 30   | 66   | 61 52 30   | 2 14 3.75      | 27 5 55.95     | mat. end.    | end.     | 1       |  |
| 31   | 29 8 45   | 67   | 62 48 45   |                | 28 6 9.14      |              |          |         |  |
| 32   | 30 0 0    | 68   | 63 45 0    | !! - !         | 29 6 22.32     | 25 1.mo      | 67 18    | 0 46    |  |
| 32   | 30 56 15  | 69   | 64 41 15   | 4 28 7.50      | 30 6 35.51     | 26 2.        | 69 33    | 2 15    |  |
| 33   | 31 52 30  | 70   | 1          | 5 35 9.38      | 31 6 48.69     | 27 3.        | 73 5     | 3 32    |  |
| 35   | 32 48 45  | 71   | 65 37 30   | 6 42 11.25     | 32 7 1.88      | 28 4.        | 77 39    | 4 84    |  |
| 36   | 1         | 72   | 66 33 45   | 7 49 13.13     |                | 29 5.        | 82 58    | 5 19    |  |
| 30   | 133 45 Q  | 4 72 | 167 90 0   | 8  56 15.00    | H t            | 30 6-        | 90 0     | 7 2     |  |

TABLE LXXXII.

TO FIND THE NUMBER OF DAYS CONTAINED BETWEEN ANY TWO DAYS IN THE YEAR.

| Days. | Jan. | Feb.       | March | April. | May. | June. | July. | Aug.        | Sept. | Oct. | Nov. | Dec. |
|-------|------|------------|-------|--------|------|-------|-------|-------------|-------|------|------|------|
| 1     | i    | 32         | 60    | 91     | 121  | 152   | 182   | 213         | 244   | 274  | 305  | 335  |
| 2     | 2    | 33         | 61    | 92     | 122  | 153   | 183   | 214         | 245   | 275  | 306  | 336  |
| - 3   | 3    | 34         | 62    | 93     | 123  | 154   | 184   | 215         | 246   | 276  | 307  | 337  |
| 4     | 4    | 35         | 63    | 94     | 124  | 155   | 185   | 216         | 247   | 277  | 308  | 338  |
| 5     | 5    | 36         | 64    | 95     | 125  | 156   | 186   | 217         | 248   | 278  | 309  | 359  |
| 6     | 6    | 37         | 65    | - 96   | 126  | 157   | 187   | 218         | 249   | 279  | 310  | 340  |
| 7     | 7    | 38         | 66    | 97     | 127  | 158   | 188   | 219         | 250   | 280  | 311  | 341  |
| 8     | 8    | 39         | 67    | 98     | 128  | 159   | 189   | 220         | 251   | 281  | 312  | 342  |
| 9     | 9    | 40         | 68    | 99     | 129  | 160   | 190   | 221         | 252   | 282  | 313  | 343  |
| 10    | 10   | 41         | 69    | 100    | 130  | 161   | 191   | 222         | _ 253 | 283  | 314  | 344  |
| 11    | 11   | 42         | 70    | 101    | 131  | 162   | 192   | 223         | 254   | 284  | 315  | 345  |
| 12    | 12   | 48         | 71    | 102    | 132  | 163   | 193   | 224         | 255   | 285  | 316  | 346  |
| 13    | 13   | 44         | . 72  | 103    | 133  | 164   | 194   | 225         | 256   | 286  | 317  | 347  |
| 14    | 14   | 45         | 73    | 104    | 134  | 165   | 195   | 226         | 257   | 287  | 318  | 348  |
| 15    | 15   | <b>4</b> 6 | 74    | 105    | 135  | 166   | 196   | <b>2</b> 27 | 258   | 288  | 319  | 349  |
| 16    | 16   | 47         | 75.   | 106    | 136  | 167   | 197   | 228         | 259   | 289  | 320  | 350  |
| 17    | 17   | 48         | 76    | 107    | 137  | 168   | 198   | 229         | 260   | 290  | 321  | 351  |
| 18    | 18   | 49         | . 77  | 108    | 138  | 169   | 199   | 230         | 261   | 291  | 322  | 352  |
| 19    | 19   | 50         | 78    | 109    | 139  | 170   | 200   | 231         | 262   | 292  | 323  | 353  |
| 20    | . 20 | 51         | 79    | 110    | 140  | 171   | 201   | 232         | 263   | 293  | 324  | 354  |
| 21    | 21   | 52         | 83    | 111    | 141  | 172   | 202   | 233         | 264   | 294  | 325  | 355  |
| 22    | 22   | 53         | 81    | 112    | 142  | 173   | 203   | 234         | 265   | 295  | 326  | 336  |
| 23    | 23   | 54         | 82    | 113    | 143  | 174   | 204   | 235         | 266   | 296  | 327  | 357  |
| 24    | 24   | 55         | 83    | 114    | 144  | 175   | 205   | 236         | 267   | 297  | 328  | 358  |
| 25    | 25   | <i>5</i> 6 | 84    | 115    | 145  | 176   | 206   | 237         | 268   | 298  | 329  | 359  |
| 26    | 26   | 57         | 85    | 116    | 146  | 177   | 207   | 238         | 269   | 299  | 330  | 360  |
| 27    | 27   | 58         | 86    | 117    | 147  | 178   | 208   | 239         | 270   | 300  | 331  | 361  |
| 28    | 28   | 59         | 87    | 118    | 148  | 179   | 209   | 240         | 271   | 301  | 332  | 362  |
| 29    | 29   |            | 88    | 119 .  | 149  | 180   | 210   | 241         | 272   | 302  | 333  | 363  |
| 30    | 30   |            | 89    | 120    | 150  | 181   | 211   | 242         | 273   | 303  | 334  | 364  |
| 31    | 31   |            | 90    |        | 151  |       | 212   | 243         |       | 304  |      | 365  |

### TABLE LXXXIII.

CONTAINING THE NUMBER OF DAYS BETWEEN THE OLD AND NEW STILE, IN DIFFERENT PERIODS.

| Yrs. bef. Years bef. Years bef. Years aft. Yrs. aft.                          | 11 TZ C. )   |
|---|--------------|
|   | Yrs. aft.    |
| Christ, Days   Christ, Days   Christ, Days   Christ, Days   Christ, Day       | Christ, Days |
| N. S.   diff.   N. S.   diff.   N. S.   diff.   N. S.   diff.   N. S.   diff. |              |
|   | -            |
| L.6000  47    L.4000  32    L.2000  17    L. 0   2    L.2000   -13            | L.4000 +28   |
| 5900   46     3900   31   1900   16   Aft. 100   1   2100   14                | 4100 29      |
| 5800   45   . 3800   30    1800   15    200   + 0    2200   18                | 4200 30      |
| 5700   44     3700   29     1700   14     300   1   2300   16                 | 4300   31    |
| L. 5600   44   L. 3600   29   L. 1600   14   L. 400   1   L. 2400   16        | L.4400   31  |
| 5500   43   3500   28   1500   13   500   2   2500   17                       | 4500 32      |
| 5400   42   3400   27   1400   12   600   3   2600   18                       | 4600 33      |
| 5300 41   5300 26   1300 11   700 4   2700 15                                 | 4700 34      |
| L.5200 41   L.3200 26   L.1200 11   L. 800 4   L.2800 15                      | L.4800 34    |
| 5100 40   \$100   25   1100   10   900   5   2900   20                        | 4900 35      |
| 230 25 25 25 25 25 25 25 25 25 25 25 25 25                                    | - 3500       |
| 5000   39   3000   24   1000   9   1000   6   3000   21                       | 5000 36      |
| 4900   38   2900   23   900   8   1100   7   3100   29                        | 5100 . 37    |
| L,4800   38   L,2800   23   L, 800   8   L,1200   7   L,3200   29             | L.5200 37    |
| 4700   37   2700   22   700   7   1300   8   3300   23                        | 5300 38      |
| 4600 36 2600 21 600 6 1400 9 3400 24  | 5400 39      |
| 4500   35   2500   30   500   5   1500   10   3500   25                       | 5500 40      |
| L.4400   85   L.2400   20   L. 400   5   L.1600   10   L.3600   29            | L.5600 40    |
| 4300   34   2300   19   300   4   1700   11   3700   26                       | 5700 41      |
| 4200   33   2200   18   200   3   1800   12   3800   2                        | 5800 42      |
| 4100   92   2100   17   100   2   1900   13   3900   2                        |              |
| 1200   02    2100   11    100   2    1300   13    3900   20                   | 1 5900   43  |

## TABLE LXXXIV.

### WEIGHTS AND MEASURES. WEIGHTS. TROY WEIGHT USED BY GOLDSMITHS. APOTHECARIES. 20 Grains make 1 Scruple, marked 24 Grains make 1 Pennyweight, marked, dwt. 1 Dram 3 Scruples 20 Pennywts. 1 Ounce 07. 12 Ounces = 8 Drams 1 Ounce 1 Pound lb. 12 Ounces 1 Pound ĺb. WOOL WEIGHT. AVOIRDUPOIS WEIGHT. 7 Pounds make 1 Clove 16 Drams make 1 Ounce 2 Cloves 1 Stone 16 Ounces 1 Pound 2 Stones 1 Tod = 28 Pounds 1 Quarter 1 Wey 6₫ Tods 4 Quarters 1 Hundred weight 2 Weys 1 Sack = 20 Ĥundred weight 1 Ton. 12 Sacks 1 Last. HAY WEIGHT. COMPARISON OF TROY AND AVOIR-14 Pounds DUPOIS WEIGHTS. make 1 Stone 40 Pounds of Straw 1 Truss 175 Troy Pounds are = to 144 Avoird. Pounds 56 Pounds of Old Hay 1 Truss 175 Troy Ounces are = to 192 Avoird. Ounces 60 Pounds of New Hay Ì Truss 1 Troy Pound contains 5760 Grains 36 Trusses Load. 1 Avoirdup. Pound contains 7000 Grains SCOTS TROY, or DUTCH WEIGHT. 1 Troy Ounce contains 480 Grains 16 Drops make 1 Ounce 1 Avoirdupois Ounce contains 437.5 Grains 1 Avoirdupois Dram contains 16 Ounces 1 Pound 27.34375 gr. 16 Pounds 1 Stone 1 Troy lb. = 13oz. 2.651428576 drams Avoir. 1 Avoird lb. = 1lb. 20z. 11 dwts. 16 gr. Troy. | One Pound contains 103lb. 2½ oz. Dutch. One Pound contains 7600 grains, one hun-MEASURES. LONG MEASURE. CLOTH MEASURE. 12 Inches make 1 Foot 21 Inches 1 Nail make 1 Quarter 1 Yard 3 Feet 1 Yard 4 Nails 54 Yards 1 Pole Quarters . 40 Poles 1 Furlong 3 Quarters 1 Ell Flemish 8 Furlongs 1 Mile 5 Quarters 6 Quarters 1 Ell English 69 one-tenth miles, nearly 1 Degree. 1 Ell French The Degree is also divided into 60 equal parts, 4 Quarters 1 1-5th in. = 1 Ell Scots. called Nautical, or Geographical miles, three of Or 37 1-5th which are equal to one League. ENGLISH LAND MEASURE. SCOTS LAND MEASURE. 9 Square Feet make 1 Square Yard 36 Square Ells 1 Fall make 304 Yards 1 Pole 40 Falls 1 Rood 40 Poles 1 Rood 4 Roods 1 Acre. 4 Roods l'Acre. SOLID MEASURE. COAL MEASURE. 1728 Cubic Inches make 3 Bushels 1 Cubic Foot make 1 Sack 36 Bushels, or 12 Sacks 27 Feet 1 Yard or Load. 1 Chaldron. WINE MEASURE. ALE AND BEER MEASURE. 2 Pints 2 Pints make. 1 Quart make 1 Quart 4 Quarts 1 Gallon = 231 in, 4 Quarts 1 Gall = 282 inch. 42 Gallons 1 Tierce 8 Gall. of Ale, or 9 of Beer = 1 Firkin 63 Gallons 1 Hogshead 2 Firkins 1 Kilderkin 84 Gallons, or 11 hhd. = 1 Puncheon 2 Kilderkins 1 Barrel 2 Hogsheads 1 Pipe 1 Barrels 1 Hogshead 2 Barrels = 1 Puncheon, and 3 = 1 Butt. 2 Pipes 1 Tun. ENGLISH DRY MEASURE. SCOTS DRY MEASURE. 1 Peck 1 Gallon = 268 4-5ths in. make 8 Pints make 4 Lippies 2 Gallons 4 Pecks 1 Firlot 1 Peck = 4 Firlots 4 Pecks 'I Bushel 1 Boll = 8 Bushels 16 Bolls 1 Chaldron. 1 Quarter. CIRCLE. TIME. · 1 Minute 60 Seconds . make 1 Minute 60 Seconds make

1 Degree

1 Sign 1 Circle.

60 Minutes

30 Degrees

12 Signs

60 Minutes

24 Hours

7 Days

1 Hour

1 Day

1 Week, 365 Days = 1 Year.

## TABLE LXXXV.

## SPECIFIC GRAVITIES.

| Part   Platina   | Name.—Solids.                     | Sp. Grav.    | Name.—Solids.     | Sp. Grav. |
|--|-----------------------------------|--------------|-------------------|-----------|
| Beroka   19640   19640   19640   19640   19660   196   |                                   | <u> </u>     |                   |           |
| 1888   207   200   1660   1680   1680   1690   16   |                                   |              |                   | - 1       |
| Calculus Humanus   1690   1590   2nadard Silver, struck into money   10629   2nadard Silver, cast   15928   3muth   15929      | andard Cold                       |              |                   |           |
| ine Silver andard Silver, struck into money   10629   andard Silver, cast   10528   13970   13 |                                   |              |                   |           |
| Sandard Silver, cast   10528   Signum Vitz   1397  |                                   |              |                   |           |
| ismuth.         9700         Coal         1260           ine Copper         9000         Jet         1238           opper halfpence         8915         Ebony         1177           un Metal         8784         Pitch         1150           ine Brass         8000         Mahogany         1063           stel         7850         Amber         1040           panish Bar Iron         7818         Box Wood         1031           wedish Bar Iron         7818         Box Wood         1030           on         7645         Bees Wax         955           ewter         7471         Oak         925           ast Iron         7425         Gunpowder, shaken         922           in         7300         Ice.         908           lasive Cinnabar         5280         Ash         800           oadstone         5018         Maple.         755           jajis Calaminaris         5000         Beech         750           lungarian Antimony         4700         Plumbtree         663           fean of the whole Earth         4500         Emech         700           lungarian Antimony         400         Elm.<   | andard Silver, struck into money. |              |                   | 1375      |
| December   1900   Jet   1938   1900   | andard Silver, cast               | 10528        |                   | 1827      |
| Description  |                                   | 1            |                   |           |
| New Notes   State      |                                   |              |                   |           |
| ine Brass  | opper nairpence                   | 8915         | Ebony             | 1177      |
| ast Brass   8000   Mahogany   1063   1060   1061    |                                   |              | Pitch             |           |
| Teel   |                                   |              |                   |           |
| panish Bar Iron   7827   Brazil Wood   1031     wedish Bar Iron   7818   Box Wood   1030     tweet   7471   Oak   925     weter   7471   Oak   925     sat Iron   7425   Gunpowder, shaken   922     in   7320   Ice   908     lative Cinnabar   5280   Ash   800     oadstone   5018   Ash   755     apis Calaminaris   5000   Beech   705     tungarian Antimony   4700   Flumbtree   663     fean of the whole Earth   4500   Cedar   613     rude Antimony   4000   Elm   600     wedish Granite   9978   Fir   550     ast India Diamond   3519   Sassafras Wood   482     razail Diamond   3519   Sassafras Wood   482     razail Diamond   3510   Fluids     Irranite   3500     Vhite Lead   3160     Inrystal Glass   2942   Oil of Vitriol   1700     farble   2703   Oil of Tartar   1550     Iand Chrystal   2720   Honey   1450     farble   2703   Spirit of Nitre   1315     sebble Stone   2668   Aqua Fortis   1300     aper   2666   Treacle   1290     oak Chrystal   2256   Human Blood   1054     rear Glass   29610   Canary Wine   1033     int   2596   Origan   1028     ormon Stone   2500   Ale   1028     ommon Stone   2500   Tar   1026     brystal   2210   Tar   1015     arian Marble   2560   Ale   1029     ommon Earth   1984     itre   1900   Insteed Oil   993     abaster   1874   Oilve Oil   7726     Application   1880   Application   1890     alphar   1810   Oil of Turpentine   806     alphar   1810   Oil of Turpentine   806   |                                   |              | Mahogany          | 1         |
| wedish Bar Iron  |                                   |              |                   |           |
| on         7645 ewter         Bee's Wax         955 Oak           ewter         7471 Oak         925 Oak         925 Oak           six Iron         7425 Oak         922 Oak           in         7320 Oak         913           Iative Cinnabar         7300 Oak         10 Oak           Iass of Antimony         5280 Oak         Ash         800           Oadstone         5018 Oak         Ash         800           oadstone         5018 Oak         Maple         755           apis Calaminaris         5000 Oadstone         600         Plumbtree         663           fean of the whole Earth         4500 Oedar         613         613           rude Antimony         4000 Oedar         611         600           fean of the whole Earth         4500 Oedar         613         613           rude Antimony         4000 Oedar         613         6613         6613           rude Antimony         4000 Oedar         613         660         6613         6613         6613         660         6613         6613         660         6613         6613         660         6613         6613         6613         6613         6613         6613         6613         6613<   |                                   |              |                   |           |
| Section   1922   Corporation   1922   Corporation   1923   Corporation   1924   Corporation   1925   Corporation   1926   Corporation   |                                   | 1            |                   | 955       |
| In   |                                   |              | Oak               |           |
| Sative Cinnabar   7300   Ice   908   Icas of Antimony   5280   Ash   800   A   |                                   |              |                   |           |
| Ash  | in                                | 7320         | Logwood           | 913       |
| oadstone         5018         Maple         755           apis Calaminaris         5000         Beech         700           flungarian Antimony         4700         Plumbtree         663           fean of the whole Earth         4500         Elm         603           wedish Granite         3978         Fir         550           ast India Diamond         3519         Sassafras Wood         482           razil Diamond         3513         Cork         240           ranite         3500         Fluids         482           varial Class         3150         Jate Glass         1860           hrystal Glass         3150         Jate Glass         1860           late Glass         2942         Oil of Vitriol         1700           late Glass         2942         Oil of Tartar         1550           land Chrystal         2720         Spirit of Nitre         1315           late Glass         2942         Oil of Tartar         1550           land Chrystal         2703         Spirit of Nitre         1315           ebble Stone         2698         Aqua Fortis         1300           asper         2666         Treacle         1290  | lative Cinnabar                   | 7300         |                   | , ,       |
| apis Calaminaris   5000   Beech   700   Iungarian Antimony   4700   Plumbtree   668   668   168   1700      |                                   |              |                   |           |
| Tungarian Antimony   |                                   |              |                   |           |
| fean of the whole Earth rude Antimony         4500         Cedar         613           rude Antimony         4000         Elm         600           wedish Granite         9978         550           ast India Diamond         3519         Sassafras Wood         482           razil Diamond         3513         Cork         240           ranite         3500         Fluids         240           ranite         3160         Fluids         1800           hrystal Glass         3150         Quicksilver         19600           late Glass         2942         Öil of Vitriol         1700           enetian Tale         2780         Oil of Tartar         1550           land Chrystal         2720         Honey         1450           farble         2730         Spirit of Nitre         1315           ebble Stone         2698         Aqua Fortis         1300           asper         2666         Aqua Fortis         1294           earl         2650         Aqua Regia         1234           earl         2660         Urine         1033           lint         2500         Urine         1030           ortland Stone         2570 </td <td></td> <td></td> <td></td> <td></td>  |                                   |              |                   |           |
| Tude Antimony         4000 wedish Granite         Elm.         600 wedish Granite         550           ast India Diamond         3519         Sassafras Wood         482           razil Diamond         3519         Cork.         240           ranite         3500         Fluids.         240           ranite         3500         Fluids.         1500           hrystal Glass         3150         Ouicksilver         13600           late Glass         2942         Öil of Vitriol         1700           enetian Talc         2780         Honey         1450           land Chrystal         2720         Honey         1450           larble         2703         Piprit of Nitre         1315           ebble Stone         2698         Aqua Fortis         1300           asper         2666         Treacle         1290           ock Chrystal         2650         Aqua Regia         1234           earl         2630         Human Blood         1054           recn Glass         2610         Canary Wine         1033           lint         2596         Milk         1031           ortland Stone         2560         Sea Water         1030     <   |                                   |              |                   |           |
| wedish Granite         3978         Fir         550           ast India Diamond         3519         Sassafras Wood         482           razil Diamond         3513         Cork.         240           branite         3500         Wite Lead         3160         Fluids.           Chrystal Glass         3150         Quicksilver         13600           hrystal Glass         2942         Öil of Vitriol         1700           enetian Talc         29780         Honey         1450           Jand Chrystal         2720         Honey         1450           farble         2720         Spirit of Nitre         1315           eable Stone         2698         Aqua Fortis         1300           asper         2666         Treacle         1290           ock Chrystal         2650         Aqua Regia         1234           earl         2560         Aqua Regia         1034           int         2596         Urine         1032           ortland Stone         2570         Milk         1031           arian Marble         2560         Sea Water         1030           nyx         2510         Ale         1026           brys  |                                   |              | 1                 |           |
| Paralle  |                                   |              |                   | 550       |
| Pranite  |                                   | 3519         | Sassafras Wood    |           |
| Vhite Lead.         3160         Fluids.           hrystal Glass         3150         Quicksilver         13600           late Glass.         2942         Öil of Vitriol         1700           enetian Talc         2780         Oil of Tartar         1550           land Chrystal         2720         Honey         1450           farble         2703         Spirit of Nitre         1315           ebble Stone         2698         Aqua Fortis         1300           asper         2666         Treacle         1290           ock Chrystal         2650         Aqua Regia         1234           earl         2630         Human Blood         1054           recn Glass         2610         Urine         1038           lint         2596         Wilk         1031           ortland Stone         2570         Milk         1031           arian Marble         2560         Sea Water         1030           nyx         2510         Ale         1028           ommon Stone         2500         Vinegar         1026           hrystal         2210         Spring Water         1000           yster Shells         2092         Red  | razil Diamond                     | <b>3</b> 513 | Cork              | 240       |
| Vhite Lead.         3160         Fluids.           hrystal Glass         3150         Quicksilver         13600           late Glass.         2942         Öil of Vitriol         1700           enetian Talc         2780         Oil of Tartar         1550           land Chrystal         2720         Honey         1450           farble         2703         Spirit of Nitre         1315           ebble Stone         2698         Aqua Fortis         1300           asper         2666         Treacle         1290           ock Chrystal         2650         Aqua Regia         1234           earl         2630         Human Blood         1054           recn Glass         2610         Urine         1038           lint         2596         Wilk         1031           ortland Stone         2570         Milk         1031           arian Marble         2560         Sea Water         1030           nyx         2510         Ale         1028           ommon Stone         2500         Vinegar         1026           hrystal         2210         Spring Water         1000           yster Shells         2092         Red  | ranite                            | 3500         |                   |           |
| See Note   | Vhite Lead                        |              |                   | l l       |
| enetian Talc         2780         Oil of Tartar         1550           land Chrystal         2720         Honey         1450           farble         2703         Spirit of Nitre         1315           ebble Stone         2698         Aqua Fortis         1300           asper         2666         Treacle         1290           ock Chrystal         2650         Aqua Regia         1234           earl         2630         Human Blood         1054           treen Glass         2610         Canary Wine         1033           lint         2596         Urine         1032           ortland Stone         2570         Milk         1031           arian Marble         2560         Sea Water         1030           nyx         2510         Ale         1026           ommon Stone         2500         Vinegar         1026           brystal         2210         Tar         1015           lay         2160         Spring Water         1000           yster Shells         2092         Distilled Water         993           rick         2000         Red Wine         993           litrol         1880         Proo   | hrystal Glass                     |              |                   |           |
| Ind Chrystal   2720   Honey   1450   Ind Chrystal   2703   Spirit of Nitre   1315   Ind Chrystal   2698   Aqua Fortis   1300   Ind Chrystal   2650   Aqua Regia   1234   Ind Chrystal   2650   Aqua Regia   1234   Ind Chrystal   2650   Aqua Regia   1234   Ind Chrystal   2650   Ind Chrystal   2650   Ind Chrystal   2650   Ind Chrystal   2650   Ind Chrystal   2596   Ind Chrystal   2596   Ind Chrystal   2596   Ind Chrystal   2596   Ind Chrystal   2590   Ind Chrystal   2590   Ind Chrystal   2590   Ind Chrystal   2210   Ind Chrystal   2092   Ind Chrystal   2092   Ind Chrystal   2092   Ind Chrystal   2092   Ind Chrystal   2093   Ind Chrystal   2094   Ind Chrystal   2095   Ind Chrystal   2096   Ind Chrystal   2097   Ind Chrystal   2098   Ind Chrystal   2099   Ind Chrys   | Inte Glass                        |              |                   |           |
| farble.         2703         Spirit of Nitre         1315           ebble Stone         2698         Aqua Fortis         1300           asper         2666         Treacle.         1290           ock Chrystal         2650         Aqua Regia         1234           earl         2630         Human Blood         1054           recn Glass.         2610         Canary Wine         1033           lint         2596         Urine         1032           ortland Stone         2570         Milk         1031           arian Marble         2560         Sea Water         1030           nyx         2510         Ale         1028           ommon Stone         2500         Vinegar         1026           hrystal         2210         Tar         1015           lay         2160         Spring Water         1000           yster Shells         2092         Distilled Water         993           rick         2000         Red Wine         993           rick         2000         Red Wine         992           ommon Earth         1984         Burguady Wine         953           litre         1900         Lintseed Oil   |                                   |              |                   |           |
| ebble Stone         2698         Aqua Fortis         1300           asper         2666         Treacle         1290           ock Chrystal         2650         Aqua Regia         1234           earl         2630         Human Blood         1054           recn Glass         2610         Urine         1038           lint         2596         Urine         1032           ortland Stone         2570         Milk         1031           arian Marble         2560         Sea Water         1030           nyx         2510         Ale         1028           ommon Stone         2500         Vinegar         1026           hrystal         2210         Spring Water         1000           yster Shells         2092         Distilled Water         993           rick         2092         Red Wine         993           rick         2000         Red Wine         993           itriol         1880         Proof Spirits         931           labaster         1874         Olive Oil         913           lorn         1840         Spirit of Turpentine         874           ory         1825         Pure Spirits <td></td> <td></td> <td></td> <td></td>   |                                   |              |                   |           |
| ock Chrystal         2650         Aqua Regia         1234           earl         2630         Human Blood         1054           recn Glass         2610         Canary Wine         1033           lint         2596         Urine         1032           ortland Stone         2570         Milk         1031           arian Marble         2560         Sea Water         1030           nyx         2510         Ale         1028           ommon Stone         2500         Vinegar         1026           hrystal         2210         Tar         1015           lay         2160         Spring Water         1000           yster Shells         2092         Distilled Water         993           rick         2000         Red Wine         990           ommon Earth         1984         Burguady Wine         953           litre         1900         Lintseed Oil         932           rick         2000         Red Wine         992           orn         1880         Proof Spirits         931           labaster         1874         Olive Oil         913           lorn         1840         Spirit of Turpentine <td></td> <td>2698</td> <td>Aqua Fortis</td> <td></td>  |                                   | 2698         | Aqua Fortis       |           |
| Part      |                                   | 1 1          |                   |           |
| Canary Wine   1038   1039      | ock Chrystal                      | 2650         | Aqua Regia        | 1234      |
| lint         2596         Urine         1032           ortland Stone         2570         Milk         1031           arian Marble         2560         Milk         1030           nyx         2510         Ale         1028           ommon Stone         2500         Vinegar         1026           brystal         2210         Tar         1015           lay         2160         Spring Water         1000           yster Shells         2092         Distilled Water         993           rick         2000         Red Wine         990           ommon Earth         1984         Burguady Wine         953           litre         1900         Lintseed Oil         932           tiriol         1880         Proof Spirits         931           labaster         1874         Olive Oil         913           forn         1840         Spirit of Turpentine         874           ory         1825         Pure Spirits         866           ulphur         1810         Oil of Turpentine         800           halk         1793         Æther         726  |                                   | 2630         | Human Blood       | 1054      |
| ortland Stone         2570         Milk         1031           arian Marble         2560         Sea Water         1028           nyx         2510         Ale         1028           ommon Stone         2500         Vinegar         1026           brystal         2210         Tar         1015           lay         2160         Spring Water         1000           yster Shells         2092         Distilled Water         993           rick         2000         Red Wine         990           ommon Earth         1984         Burguady Wine         953           litre         1900         Lintseed Oil         932           triol         1880         Proof Spirits         931           labaster         1874         Olive Oil         913           lorn         1840         Spirit of Turpentine         874           ory         1825         Pure Spirits         866           ulphur         1810         Oil of Turpentine         800           halk         1793         Æther         726   |                                   |              | Canary Wine       |           |
| arian Marble         2560         Sea Water         1030           nyx         2510         Ale         1028           ommon Stone         2500         Vinegar         1026           brystal         2210         Tar         1015           lay         2160         Spring Water         1000           yster Shells         2092         Distilled Water         993           rick         2000         Red Wine         990           ommon Earth         1984         Burgundy Wine         953           litre         1900         Lintseed Oil         932           itriol         1880         Proof Spirits         931           labaster         1874         Olive Oil         913           lorn         1840         Spirit of Turpentine         874           ory         1825         Pure Spirits         866           ulphur         1810         Oil of Turpentine         800           halk         1793         Æther         726   |                                   |              |                   |           |
| nyx         2510         Ale         1028           ommon Stone         2500         Vinegar         1026           hrystal         2210         Tar         1015           lay         2160         Spring Water         1000           yster Shells         2092         Distilled Water         993           rick         2000         Red Wine         990           ommon Earth         1984         Burguady Wine         953           litre         1900         Lintseed Oil         932           tiriol         1880         Proof Spirits         931           labaster         1874         Olive Oil         913           forn         1840         Spirit of Turpentine         874           ory         1825         Pure Spirits         866           ilphur         1810         Oil of Turpentine         800           halk         1793         Æther         726  |                                   |              |                   |           |
| ommon Stone         2500         Vinegar         1026           hrystal         2210         Tar         1015           lay         2160         Spring Water         1000           yster Shells         2092         Distilled Water         993           rick         2000         Red Wine         990           ommon Earth         1984         Burguady Wine         953           litre         1900         Lintseed Oil         932           itriol         1880         Proof Spirits         931           labaster         1874         Olive Oil         913           lorn         1840         Spirit of Turpentine         874           ory         1825         Pure Spirits         866           liphur         1810         Oil of Turpentine         800           halk         1793         Æther         726  |                                   |              |                   |           |
| hrystal         2210         Tar         1015           lay         2160         Spring Water         1000           yster Shells         2092         Distilled Water         993           rick         2000         Red Wine         990           ommon Earth         1984         Burguady Wine         953           fitre         1900         Lintseed Oil         932           itriol         1880         Proof Spirits         931           labaster         1874         Olive Oil         913           lorn         1840         Spirit of Turpentine         874           ory         1825         Pure Spirits         866           ulphur         1810         Oil of Turpentine         800           halk         1793         Æther         726  |                                   |              | Vinegar           |           |
| yster Shells         2092         Distilled Water         993           rick         2000         Red Wine         990           ommon Earth         1984         Burguady Wine         953           litre         1900         Lintseed Oil         992           itriol         1880         Proof Spirits         991           labaster         1874         Olive Oil         913           lorn         1840         Spirit of Turpentine         874           rory         1825         Pure Spirits         866           ulphur         1810         Oil of Turpentine         800           halk         1793         Æther         726  | hrystal                           |              | Tar               | 1         |
| rick         2000         Red Wine         990           ommon Earth         1984         Burguady Wine         953           litre         1900         Lintseed Oil         932           triol         1880         Proof Spirits         931           labaster         1874         Olive Oil         913           forn         1840         Spirit of Turpentine         874           ory         1825         Pure Spirits         866           alphur         1810         Oil of Turpentine         800           balk         1793         Æther         726  |                                   |              | Spring Water      |           |
| ommon Earth         1984         Burguady Wine         953           litre         1900         Lintseed Oil         992           ttriol         1880         Proof Spirits         931           labaster         1874         Olive Oil         913           forn         1840         Spirit of Turpentine         874           ory         1825         Pure Spirits         866           alphur         1810         Oil of Turpentine         800           balk         1793         Æther         726  | ···                               | 2092         | Distilled water   | 993       |
| litre         1900         Lintseed Oil         992           itriol         1880         Proof Spirits         931           labaster         1874         Olive Oil         913           forn         1840         Spirit of Turpentine         874           ory         1825         Pure Spirits         866           ilphur         1810         Oil of Turpentine         800           halk         1793         Æther         726   |                                   | 1 1          |                   |           |
| itriol     1880     Proof Spirits     931       labaster     1874     Olive Oil     913       forn     1840     Spirit of Turpentine     874       ory     1825     Pure Spirits     866       lphur     1810     Oil of Turpentine     800       halk     1793     Æther     726  |                                   | 1            |                   |           |
| labaster     1874     Olive Oil     913       forn     1840     Spirit of Turpentine     874       ory     1825     Pure Spirits     866       liphur     1810     Oil of Turpentine     800       halk     1793     Æther     726   |                                   |              |                   |           |
| forn         1840         Spirit of Turpentine         874           ory         1825         Pure Spirits         866           ilphur         1810         Oil of Turpentine         800           halk         1793         Æther         726   |                                   |              |                   |           |
| ory     1825     Pure Spirits     866       ilphur     1810     Oil of Turpentine     800       halk     1793     Æther     726  |                                   |              |                   |           |
| 1810   Oil of Turpentine   800   halk   1793   Æther   726   | ory                               | 1825         | Pure Spirits      |           |
| naik       1793       Æther       726         olid Gunpowder       1745       Common Air       001.232   |                                   | - 1          | Oil of Turpentine |           |
| ма сипромаст 1745    Common Air 001.232  |                                   |              | Æiner             |           |
|  | Me Suipowaci                      | 1140         | Common Air        | W1.232    |

## TABLE LXXXVI.

## ' CONTAINING THE CIRCUMFERENCE AND AREA OF A CIRCLE, TO A GIVEN DIAMETER.

| Dia   | Circum.  | Area.    | Dia      | Circum.  | Area.    | Dia  | Circum.  | Area.     | Dia.  | Circum.  | Area.     |
|-------|----------|----------|----------|----------|----------|------|----------|-----------|-------|----------|-----------|
| 1.0   | 3.14159  |          |          |          |          |      |          | 34.21194  | 9.4   | 29.53097 | 69.39778  |
| 1.1   |          |          |          |          |          |      |          | 85.25652  |       | 29.84513 | 70.88218  |
| 1.2   |          |          |          |          |          |      |          | 36.31681  |       | 30.15929 | 72.38229  |
|       | 4.08407  |          |          |          |          |      |          | 37.39281  |       | 30.47845 | 73.89811  |
|       | 4.39823  |          |          |          |          |      |          | 38.48451  |       | 30.78761 | 75.42964  |
| 1.5   |          |          |          |          |          |      |          | 39.59192  |       | 31.10177 | 76.97687  |
| 1.6   |          |          |          |          |          |      |          | 40.71504  |       |          | 78.53982  |
| [1.7] |          |          |          |          |          |      |          | 41.85387  |       |          | 80.11847  |
| 1.8   |          |          |          |          |          |      |          | 43.00840  |       |          | 81.71289  |
| 1.9   | 5.96903  | Z.83529  | <u> </u> | 14.76549 | 17.34945 | 7.5  | 23.56194 | 44.17865  | 10.3  | 32.35840 | 83.32289  |
| 2.0   | 6.28319  | 3.14159  | 4.8      | 15.07964 | 18.09557 | 7.6  | 23.87610 | 45.36460  | 10.4  | 32.67256 | 84.94867  |
| 2.1   | 6.59734  |          |          |          |          |      |          | 46.56626  |       |          | 86.5901   |
| 2.2   | 6.91150  |          |          |          |          |      |          | 47.78362  |       |          | 88.24734  |
| 2.3   | 7.22566  |          |          |          |          |      |          | 49.01670  |       |          |           |
| 2.4   |          |          |          |          |          |      |          | 50.26548  |       |          | 91.60884  |
| 2.5   |          |          |          |          |          |      |          | 51.52997  |       |          | 93.31316  |
| 2.6   |          |          |          |          |          |      |          | 52.81017  |       |          |           |
| 2.7   |          |          |          |          |          |      |          | 54.10608  |       |          | 96.76891  |
| 2.8   | 8.79646  | 6.15752  | 5.6      | 17.59292 | 24.63009 | 8.4  | 26.38938 | 55.41769  | 11.2  | 35.18584 | 98.52038  |
| 2.9   | 9.11062  | 6.60520  | 5.7      | 17.90708 | 25.51759 | 8.5  | 26.70354 | 56.74502  | 11.3  | 35.50000 | 100.28749 |
| 3,0   | 9.42478  | 7.06858  | 5.8      | 18.22124 | 26.42079 | 8.6  | 27.01770 | 58.08805  | 11.4  | 35.81416 | 102.070%  |
| 3.1   |          |          |          |          |          |      |          |           |       |          | 103.86891 |
|       | 10.05310 |          |          |          |          |      |          |           |       |          | 105.68318 |
|       | 10.36726 |          |          |          |          |      |          |           |       |          | 107.5131  |
|       | 10 68142 |          |          |          |          |      |          |           |       |          | 109 35884 |
|       | 10.99557 |          |          |          |          |      |          |           |       |          | 111.22025 |
|       |          |          |          |          |          |      |          |           |       |          | 113.09734 |
| 3.7   | 11.62389 | 10.75210 | 10.5     | 20.42035 | 33.18307 | 19.3 | 29.21681 | 107.92909 | 120.0 | 62.83185 | 314.15926 |

## TABLE LXXXVII.

### CONTAINING THE DIAMETER AND AREA OF A CIRCLE, WHOSE CIRCUM-FERENCE IS GIVEN.

| FERENCE IS GIVEN. |          |         |               |          |         |       |          |         |       |          |          |  |
|-------------------|----------|---------|---------------|----------|---------|-------|----------|---------|-------|----------|----------|--|
| Cir.              | Diameter | Area.   | Cir.          | Diameter | Area.   | Cir.  | Diameter | Area.   | Circ. | Diameter | Area.    |  |
| 1.0               | 0.31831  | 0.07958 | 3.8           | 1.20958  | 1.14910 | 6.6   | 2.10085  | 3.46639 |       | 2.99211  | 7.03147  |  |
| 1.1               | 0.35014  | 0.09629 | 3.9           | 1.24141  | 1.21037 | 6.7   | 2.13268  | 3.57223 |       | 3.02394  | 7.18187  |  |
| 1.2               |          | 0.11459 | 4.0           | 1.27324  | 1.27324 |       | 2.16451  | 3.67966 |       | 3.05577  | 7.33386  |  |
| 1.3               |          | 0.13449 |               |          | 1.33770 |       |          | 3.78868 |       | 3.08761  | 7.48744  |  |
| 1.4               |          | 0.15597 |               |          | 1.40375 |       |          | 3.89930 |       | 3.11944  | 7.64262  |  |
| 1.5               |          | 0.17905 |               |          | 1.47139 |       | 2.26000  | 4.01150 |       |          | 7.79939  |  |
| 1.6               |          | 0.20372 |               | ,        | 1.54062 |       |          | 4.12530 |       |          | 7.95775  |  |
| 1.7               |          | 0.22998 |               |          | 1.61144 |       |          | 4.24068 |       | 3.21493  |          |  |
| 1.8               |          | 0.25789 |               |          | 1.68386 |       |          | 4,35766 |       | 3.24676  |          |  |
| 1.9               | 0.60479  | 0.28727 | 4.7           | 1.49606  | 1.75787 | 7.5   | 2.38732  | 4.47623 | 10.5  | 3.27859  | 8,44237  |  |
| 2.0               |          |         |               |          | 1.83346 |       |          | 4.49639 |       |          |          |  |
| 2.1               | 0.66845  | 0.35091 |               |          | 1.91066 |       |          | 4.71815 |       |          |          |  |
| 2.2               |          |         |               |          |         |       |          | 4.84149 |       |          |          |  |
| 2.3               |          | 0.42096 |               |          | 2.06981 |       |          | 4.96648 |       | 3.40592  |          |  |
| 2.4               |          |         |               |          | 2.15177 |       |          | 4.09296 |       |          |          |  |
| 2.5               |          |         |               |          |         |       | 2.57831  | 5.22108 |       |          |          |  |
| 2.6               |          | 0.53794 |               |          | 2.32047 |       |          | 5.35079 |       |          |          |  |
| 2.7               |          |         |               |          |         |       |          | 5.48209 |       | 3.53324  |          |  |
| 2.8               | 0.89127  | 0.62389 | 5.6           | 1.78254  | 2.49555 | 8.4   | 2.65380  | 5.61499 | 11.2  | 3.56507  | 9.98220  |  |
| 2.9               | 0,92310  | 0.6692  | 5.7           | 1.81497  | 2.58547 | 8.5   | 2.70563  | 5.74947 | 11.3  | 3.59690  | 10.16125 |  |
| 3.0               | 0.95493  | 0.71620 | 5.8           | 1.84620  | 2.67699 | 8.6   | 2.73747  | 5.88555 | 11.4  | 3.62879  | 10.34189 |  |
| 3.1               | 0.98676  | 0.76474 | 5.9           | 1.87803  | 2.77009 | 8.7   | 2.76930  | 6.02322 | 11.5  | 3.66056  | 10.52412 |  |
| 3.2               | 1.01859  | 0.8148  | 76.C          | 1.90985  | 2.86479 | 8.8   | 2.80113  | 6.16248 | 11.6  |          | 10.70794 |  |
| 3.9               |          |         |               |          |         |       |          |         |       | 1        | 10.89336 |  |
| 3.4               |          |         |               |          |         |       |          | 6.44578 |       |          | 11.08037 |  |
| 3.5               |          |         |               |          |         |       |          | 6.58981 |       |          | 11.26897 |  |
| 3.6               | 1        |         |               |          |         |       |          | 6.73544 |       |          | 11.45916 |  |
| 3.7               | 1.17775  | 1.0894  | 2 <b>16</b> . | 2.06901  | 3.3621  | 519.3 | 2.96028  | 6.88266 | 120.0 | 6.38620  | 31.83Q99 |  |

## TABLE LXXXVIII.

## TO REDUCE THE DIAMETERS OF CASKS OF THE DIFFERENT VARIETIES, TO A MEAN DIAMETER.

|  | 46 |  |  |
|--|----|--|--|
|  |    |  |  |
|  |    |  |  |

| Difference between | en the | Bung | and | Head | Diameters. |
|--------------------|--------|------|-----|------|------------|
|--------------------|--------|------|-----|------|------------|

|         | Tenths of an Inch. |      |      |      |      |      |      |      |      |      |  |  |  |
|---------|--------------------|------|------|------|------|------|------|------|------|------|--|--|--|
| Inches. | .0                 | .1   | .2   | .3   | .4   | .5   | .6   | .7   | .8   | .9   |  |  |  |
| 1       | 0.67               | 0.74 | 0.81 | 0.87 | 0.94 | 1.01 | 1.08 | 1.15 | 1.21 | 1.28 |  |  |  |
| 2       | 1.35               | 1.42 | 1.49 | 1.56 | 1.62 | 1.69 | 1.76 | 1.83 | 1.90 | 1.97 |  |  |  |
| 8       | 2.04               | 2.11 | 2.17 | 2.24 | 2.31 | 2.38 | 2.45 | 2.52 | 2.59 | 2.66 |  |  |  |
| 4       | 2.73               | 2.80 | 2.87 | 2.94 | 3.01 | 3.08 | 3.15 | 3.22 | 3.29 | 3.36 |  |  |  |
| 5       | 3.43               | 3.50 | 3.57 | 3.64 | 3.71 | 3.79 | 3.86 | 3.93 | 4.00 | 4.07 |  |  |  |
| 6       | 4.14               | 4.21 | 4.28 | 4.35 | 4.42 | 4.49 | 4.56 | 4.63 | 4.71 | 4.78 |  |  |  |
| 7       | 4.85               | 4.92 | 4.99 | 5.06 | 5.14 | 5,21 | 5.28 | 5.35 | 5.42 | 5.49 |  |  |  |
| 8       | 5.57               | 5.64 | 5.71 | 5.78 | 5.85 | 5.93 | 6.00 | 6.07 | 6.14 | 6.21 |  |  |  |
| 9 ,     | 6.29               | 6.36 | 6.43 | 6.50 | 6.57 | 6.65 | 6.72 | 6.79 | 6.86 | 6.93 |  |  |  |
| 10      | 7.00               | 7.07 | 7.14 | 7.21 | 7.29 | 7.36 | 7.44 | 7.51 | 7.58 | 7.65 |  |  |  |

### FIRST VARIETY.

| Inches. | .0   | .1   | .2   | .3   | .4   | .5   | .6   | .7   | .8   | .9   |
|---------|------|------|------|------|------|------|------|------|------|------|
| 1       | 0.63 | 0.69 | 0.75 | 0.82 | 0.88 | 0.95 | 1.01 | 1.07 | 1.14 | 1.20 |
| 2       | 1.27 | 1.33 | 1.39 | 1.46 | 1.52 | 1.59 | 1.65 | 1.71 | 1.78 | 1.84 |
| 3       | 1.91 | 1.97 | 2.04 | 2.10 | 2.17 | 2.23 | 2.30 | 2.36 | 2.43 | 2.49 |
| 4       | 2.56 | 1.62 | 2.69 | 2.75 | 2.82 | 2.88 | 2.95 | 3.01 | 8.08 | 3.14 |
| 5       | 3.21 | 3.27 | 3.34 | 3.40 | 3.47 | 3.54 | 3.60 | 3.67 | 3.73 | 3.80 |
| 6       | 3.87 | 3.98 | 4.00 | 4.06 | 4.13 | 4.20 | 4.26 | 4.33 | 4.39 | 4.46 |
| 7       | 4.53 | 4.59 | 4.66 | 4.72 | 4.79 | 4.86 | 4.92 | 4.99 | 5.05 | 5.12 |
| 8       | 5.19 | 5.25 | 5.32 | 5.38 | 5.45 | 5.52 | 5.58 | 5.65 | 5.71 | 5.78 |
| 9 `     | 5.85 | 5.91 | 5.98 | 6.04 | 6.11 | 6.18 | 6.24 | 6.31 | 6.37 | 6.44 |
| 10      | 6.51 | 6.57 | 6.64 | 6.70 | 6.77 | 6.84 | 6.90 | 6.96 | 7.03 | 7.10 |

### · SECOND VARIETY.

| Inches. | .0   | .1   | .2          | .3    | .4   | .5   | .6    | .7   | .8   | .9   |
|---------|------|------|-------------|-------|------|------|-------|------|------|------|
| 1       | 0.59 | 0.64 | 0.70        | 0.76  | 0.82 | 0 88 | 0.94  | 1.00 | 1.06 | 1.12 |
| 2       | 1.18 | 1,24 | 1.30        | .1.36 | 1.42 | 1.48 | 1.54  | 1.60 | 1.66 | 1.72 |
| 3       | 1.78 | 1.84 | 1.90        | 1.96  | 2.02 | 2.08 | 2.14  | 2.20 | 2.26 | 2.32 |
| 4       | 2.38 | 2.44 | 2.50        | 2.56  | 2.62 | 2.68 | 2.74  | 2.80 | 2.86 | 2.92 |
| 5       | 2,99 | 3.05 | <b>3.11</b> | 3.17  | 3,23 | 3.29 | 5.85  | 3,41 | 3.47 | 3.53 |
| 6       | 3.60 | 3.66 | 3.72        | 3.78. | 3.84 | 3.90 | \$.96 | 4.02 | 4.08 | 4.14 |
| 7       | 4.21 | 4.27 | 4.33        | 4.39  | 4.45 | 4.51 | 4.57  | 4.63 | 4.69 | 4.75 |
| 8       | 4.82 | 4.88 | 4.94        | 5.00  | 5.06 | 5.12 | 5.18  | 5.24 | 5.90 | 5.36 |
| 9       | 5.43 | 5.49 | 5.55        | 5.61  | 5.67 | 5.73 | 5.80  | 5.86 | 5.92 | 5.99 |
| 10      | 6.05 | 6.11 | 6.17        | 6.23  | 6.30 | 6.36 | 6.42  | 6.48 | 6.54 | 6.60 |

### THIRD VARIETY.

| nches. | .0   | .1   | .2     | .3   | .4   | 5     | .6    | .7-  | .8   | .9   |
|--------|------|------|--------|------|------|-------|-------|------|------|------|
| 1      | 0.55 | 0.60 | 0.66   | 0.71 | 0.77 | 0.82  | 0.88  | 0.93 | 0.99 | 1.04 |
| 2      | 1:10 | 1.15 | 1.21   | 1.26 | 1.32 | 1.37  | 1.43  | 1.48 | 1.54 | 1.59 |
| 8      | 1.65 | 1.70 | 1.76   | 1.81 | 1.87 | 1.92  | 1.98  | 2,03 | 2 09 | 2.14 |
| 4      | 2.20 | 2.25 | 2.31   | 2.36 | 2.42 | 2.48  | 2.53  | 2.59 | 2.64 | 2.70 |
| 5      | 2.76 | 2.81 | 2.87   | 2.92 | 2.98 | 3.04  | \$.09 | 3.15 | 3.20 | 3.26 |
| 6      | 9.32 | 3.37 | 3.43   | 3.48 | 3.54 | 3.60  | 3.65  | 3.71 | 3.76 | 3.82 |
| 7      | 3.88 | 3.93 | 3.99   | 4.04 | 4.10 | 4.16  | 4.21  | 4.27 | 4.32 | 4.38 |
| 8      | 4.44 | 4.50 | 4.55   | 4.61 | 4.66 | 4.72  | 4 78  | 4.84 | 4.89 | 4.95 |
| 9      | 5.01 | 5.07 | 5.12   | 5.18 | 5.24 | 5.30  | 5.36  | 5.41 | 5.47 | 5.53 |
| 10     | 5.59 | 5.65 | 5.70 l | 5.76 | 5.82 | √5.88 | 5.94  | 5.99 | 6.05 | 6.11 |

## TABLE LXXXIX.

## REMARKABLE ÆRAS AND EVENTS.

| T  |  |  |  |
|--|--|--|--|
| Æras and Events.   | Jul. Per.  | Year of<br>World.  | Before<br>Christ.  |
| The Creation of the World  | 706  | 0  | 4007   |
| The Flood, or Deluge   | 2362   | 1656   | 2351   |
| The Assyrian Monarchy, founded by Nimrod   | 2537   | 1831   | 2176   |
| Birth of Abraham   | 2714   | 2008   | 1999   |
| Sodom and Gomorrah destroyed   | 2816   | 2110   | 1897   |
| Kingdom of Athens, founded by Cecrops  | 3157   | 2451   | 1556   |
| Moses received the Ten Commandments  | 3222   | 2516   | 1491   |
| The Israelites enter Canaan  | 3262   | 2556   | 1451   |
| The Destruction of Troy  | 3529   | 2823   | 1184   |
| Solomon's Temple founded   | 3701   | 2995   | 1012   |
|  |  | 3070   |  |
| The Argonautic Expedition  | 3776<br>- <b>3</b> 829   |  | 937  |
| Lycurgus formed his Laws   | 3838   | 3103<br>3132   | 88 <del>4</del><br>87 <i>5</i>   |
| Arbaces, first King of the Medes   | 3938   |  |  |
| Beginning of the Olympiads of the Greeks   |  | 3232   | 775  |
| Era of the Building of Rome  | 3961   | 3255   | 752  |
| Æra of Nabonassar  | 3967   | 3261   | 746  |
| First Eclipse of the Moon on record  | 3993<br>4107   | 3287   | 720  |
| First Babylonish Captivity by Nebuchadnezzar   | 4107<br>4114   | 3401   | 606  |
| Second Babylonish Captivity, and Birth of Cyrus  |  | 3408   | 599  |
| Destruction of Solomon's Temple  | 4125   | 3419   | 588  |
| Cyrus began to Reign in Babylon  | 4177<br>4223   | 3471   | 536  |
| The Battle of Marathon   |  | 3517   | 490  |
| Beginning of the Peloponnesian War   | <b>42</b> 82   | 3576   | 431  |
| Alexander the Great died   | 4390   | 3684   | 323  |
| Captivity of 100000 Jews by Ptolemy  | 4393   | 3687   | 320  |
| Archimedes killed at Syracuse  | 4506   | 3800   | 207  |
| Julius Casar invaded Britain   | 4659   | 3953   | 54   |
| He corrected the Kalendar  | 4667   | 3961   | 46   |
| Cæsar killed in the Senate-house   | 4671   | 3965   | 42   |
| The Battle of Actium   | 4683   | 3977   | 30   |
| The true Æra of the Birth of Christ  | 4709   | 4003   | 4  |
| Commencement of the Christian Æra.   |  |  | sin. Christ.   |
| The Dionysian, or vulgar Æra of Christ's birth   | 4713   | 4007   | 0  |
| Crucifizion of Christ, April 3d  | 4746   | 4040   | 33   |
| Jerusalem destroyed  | 4783   | 4077   | 70   |
| Adrian's Wall built in Britain   | 4833   | 4127   | 120  |
| The Dioclesian Epoch, or that of Martyrs   | 4997   | 4291   | 284  |
| The Council of Nice  | <i>5</i> 038   | 4332   | 325  |
| Constantine the Great died   | <i>5</i> 050   | 4844   | 337  |
| The Saxons invited into Britain  | 5158   | 4452   | 445  |
| 9  |  |  |  |
|  | 5335   | 4629   | 662  |
| The Arabian Hegira, or flight of Mohammed The Death of Mohammed  | 5335<br>5343   | 4629<br>4637   | 662<br>630   |
| The Arabian Hegira, or flight of Mohammed The Death of Mohammed The Persian Yesdegird  | 5948<br>5944   |  |  |
| The Arabian Hegira, or flight of Mohammed The Death of Mohammed The Persian Yesdegird  | 5948<br>5944   | 4637   | 630  |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The ①, D, and Planets h, 4, 3, 2, \$, in libra, seen from Earth   | 5948<br>5944   | 4637<br>4638   | 690<br>691   |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The O, D, and Planets 1, 4, 3, 2, 2, in libra, seen from Earth  The Art of Printing discovered  | 5343<br>5344<br>5899   | 4637<br>4638<br>5193   | 690<br>691<br>1186   |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The O, p, and Planets 1, 4, 5, 2, 2, in libra, seen from Earth The Art of Printing discovered  The Reformation begun by Martin Luther   | 5948<br>5944<br>5899<br>6153   | 4637<br>4638<br>5193<br>5447   | 630<br>631<br>1186<br>1440   |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The ①, D, and Planets 1, 4, 5, 2, 3, in libra, seen from Earth  The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  | 5343<br>5344<br>5899<br>6153<br>6230   | 4637<br>4638<br>5193<br>5447<br>5524   | 690<br>691<br>1186<br>1440<br>1517   |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The ①, D, and Planets 1, 1, 3, 2, 2, 2, in libra, seen from Earth  The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  The Kalendar corrected by Pope Gregory   | 5343<br>5344<br>5899<br>6153<br>6230<br>6259   | 4637<br>4638<br>5193<br>5447<br>5524<br>5553   | 630<br>631<br>1186<br>1440<br>1517<br>1546   |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The ①, D, and Planets 1, 4, 5, 2, 3, in libra, seen from Earth  The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  | 5948<br>5944<br>5899<br>6153<br>6230<br>6259<br>6295   | 4637<br>4638<br>5193<br>5447<br>5524<br>5553<br>5580   | 630<br>631<br>1186<br>1440<br>1517<br>1546<br>1582   |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The ①, D, and Planets 1/2, 2/3, 2/3, in libra, seen from Earth  The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  The Kalendar corrected by Pope Gregory  Sir Isaac Newton born at Woolstrope in Lincolnshire, Dec. 25.  Mr. John Flamsteed, first Astronomer Royal, born August 19.  | 5949<br>5944<br>5899<br>6153<br>6230<br>6259<br>6295<br>6355   | 4637<br>4638<br>5193<br>5447<br>5524<br>5553<br>5580<br>5649   | 630<br>631<br>1186<br>1440<br>1517<br>1546<br>1582<br>1642   |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The O, D, and Planets 1, 14, 3, 2, 3, in libra, seen from Earth The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  The Kalendar corrected by Pope Gregory Sir Isaac Newton born at Woolstrope in Lincolnshire, Dec. 25.  Mr. John Flamsteed, first Astronomer Royal, born August 19.  Dr. Edmund Halley, second Astronomer Royal, born Oct. 27.  The Royal Society established in London July 15.  | 5343<br>5344<br>5899<br>6153<br>6230<br>6259<br>6295<br>6355<br>6359   | 4637<br>4638<br>5193<br>5447<br>5524<br>5553<br>5580<br>5649<br>5653   | 630<br>631<br>1186<br>1440<br>1517<br>1546<br>1582<br>1642<br>1646   |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The O, D, and Planets 1, 14, 3, 2, 3, in libra, seen from Earth The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  The Kalendar corrected by Pope Gregory Sir Isaac Newton born at Woolstrope in Lincolnshire, Dec. 25.  Mr. John Flamsteed, first Astronomer Royal, born August 19.  Dr. Edmund Halley, second Astronomer Royal, born Oct. 27.  The Royal Society established in London July 15.  | . 5348<br>5344<br>5899<br>6153<br>6230<br>6259<br>6295<br>6355<br>6359   | 4697<br>4698<br>5193<br>5447<br>5524<br>5553<br>5580<br>5649<br>5653   | 690<br>631<br>1186<br>1440<br>1517<br>1546<br>1582<br>1642<br>1646   |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The ①, D, and Planets 1, 1, 2, 2, 2, in libra, seen from Earth The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  The Kalendar corrected by Pope Gregory Sir Isaac Newton born at Woolstrope in Lincolnshire, Dec. 25.  Mr. John Flamsteed, first Astronomer Royal, born August 19.  Dr. Edmund Halley, second Astronomer Royal, born Oct. 27.   | 5348<br>5344<br>5899<br>6153<br>6230<br>6259<br>6295<br>6355<br>6359   | 4697<br>4698<br>5193<br>5447<br>5524<br>5553<br>5589<br>5649<br>5653<br>5668   | 630<br>631<br>1186<br>1440<br>1517<br>1546<br>1582<br>1642<br>1646   |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The Q, D, and Planets h, H, G, Q, Y, in libra, seen from Earth The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  The Kalendar corrected by Pope Gregory  Sir Isaac Newton born at Woolstrope in Lincolnshire, Dec. 25.  Mr. John Flamsteed, first Astronomer Royal, born August 19.  Dr. Edmund Halley, second Astronomer Royal, born Oct. 27.  The Royal Society established in London July 15.  Foundation of the Royal Observatory at Greenwich laid Aug. 10.  Dr. James Bradley, third Astronomer Royal, born   | 5343<br>5344<br>5894<br>6153<br>6230<br>6259<br>6295<br>6355<br>6359<br>6369<br>6375<br>6388<br>6405                                 | 4697<br>4698<br>5193<br>5447<br>5559<br>5589<br>5649<br>5653<br>5669<br>5669   | 690<br>691<br>1186<br>1440<br>1517<br>1546<br>1582<br>1642<br>1646<br>1656<br>1662   |
| The Arabian Hegira, or flight of Mohammed The Death of Mohammed The Persian Yesdegird The O, D, and Planets 1, 14, 3, 2, 3, in libra, seen from Earth The Art of Printing discovered The Reformation begun by Martin Luther Tycho Brahé born December 14th, at Knudstorp The Kalendar corrected by Pope Gregory Sir Isaac Newton born at Woolstrope in Lincolnshire, Dec. 25. Mr. John Flamsteed, first Astronomer Royal, born August 19.  Dr. Edmund Halley, second Astronomer Royal, born Oct. 27. The Royal Society established in London July 15. Foundation of the Royal Observatory at Greenwich laid Aug. 10.   | 5343<br>5344<br>5894<br>6153<br>6230<br>6259<br>6295<br>6355<br>6359<br>6369<br>6375<br>6388<br>6405                                 | 4697<br>4698<br>5193<br>5447<br>5553<br>5589<br>5649<br>5653<br>5669<br>5669<br>5682   | 630<br>631<br>1186<br>1440<br>1517<br>1546<br>1582<br>1642<br>1646<br>1656<br>1662<br>1675<br>1692   |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The O, D, and Planets 1, 1, 2, 2, 2, in libra, seen from Earth The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  The Kalendar corrected by Pope Gregory  Sir Isaac Newton born at Woolstrope in Lincolnshire, Dec. 25.  Mr. John Flamsteed, first Astronomer Royal, born August 19.  Dr. Edmund Halley, second Astronomer Royal, born Oct. 27.  The Royal Society established in London July 15.  Foundation of the Royal Observatory at Greenwich laid Aug. 10.  Dr. James Bradley, third Astronomer Royal, born  The Treaty of Union between Eng. and Scotland, signed July 22.   | 5343<br>5344<br>5899<br>6153<br>6259<br>6259<br>6295<br>6355<br>6359<br>6869<br>6875<br>6388<br>6405<br>6419                         | 4697<br>4698<br>5193<br>5447<br>5594<br>5589<br>5649<br>5653<br>5669<br>5669<br>5682<br>5699<br>5713<br>5734                         | 690<br>691<br>1186<br>1440<br>1517<br>1546<br>1582<br>1642<br>1646<br>1656<br>1662<br>1675<br>1692<br>1706                                 |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The Q, D, and Planets 1, 1, 2, 2, 3, in libra, seen from Earth The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  The Kalendar corrected by Pope Gregory Sir Isaac Newton born at Woolstrope in Lincolnshire, Dec. 25.  Mr. John Flamsteed, first Astronomer Royal, born August 19.  Dr. Edmund Halley, second Astronomer Royal, born Oct. 27.  The Royal Society established in London July 15.  Foundation of the Royal Observatory at Greenwich laid Aug. 10.  Dr. James Bradley, third Astronomer Royal, born  The Treaty of Union between Eng. and Scotland, signed July 22.  Sir Isaac Newton died March 20th.   | 5348<br>5344<br>5899<br>6153<br>6259<br>6259<br>6259<br>6355<br>6359<br>6869<br>6875<br>6888<br>6405<br>6419<br>6440                 | 4697<br>4698<br>5193<br>5447<br>5524<br>5553<br>5689<br>5653<br>5669<br>5682<br>5699<br>5713   | 630<br>631<br>1186<br>1440<br>1517<br>1546<br>1642<br>1646<br>1656<br>1662<br>1675<br>1692<br>1706   |
| The Arabian Hegira, or flight of Mohammed The Death of Mohammed The Persian Yesdegird The Q, D, and Planets h, H, S, Q, Y, in libra, seen from Earth The Art of Printing discovered The Reformation begun by Martin Luther Tycho Brahé born December 14th, at Knudstorp The Kalendar corrected by Pope Gregory Sir Isaac Newton born at Woolstrope in Lincolnshire, Dec. 25. Mr. John Flamsteed, first Astronomer Royal, born August 19.  Dr. Edmund Halley, second Astronomer Royal, born Oct. 27. The Royal Society established in London July 15. Foundation of the Royal Observatory at Greenwich laid Aug. 10. Dr. James Bradley, third Astronomer Royal, born The Treaty of Union between Eng. and Scotland, signed July 22. Sir Isaac Newton died March 20th. Planet Georgium Sidus, discovered by Dr. Herschel, March 13. Royal Society of Edinburgh incorporated  | 5348<br>5344<br>5899<br>6153<br>6230<br>6259<br>6255<br>6355<br>6355<br>6369<br>6375<br>6388<br>6405<br>6419<br>6440<br>6494         | 4697<br>4698<br>5193<br>5447<br>5524<br>5553<br>5589<br>5653<br>5669<br>5669<br>5682<br>5699<br>8713<br>5734<br>5788                 | 690<br>691<br>1186<br>1440<br>1517<br>1546<br>1582<br>1642<br>1646<br>1656<br>1662<br>1675<br>1692<br>1706<br>1727<br>1781                 |
| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The O, D, and Planets 1, 14, 3, 2, 3, in libra, seen from Earth The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  The Kalendar corrected by Pope Gregory  Sir Isaac Newton born at Woolstrope in Lincolnshire, Dec. 25.  Mr. John Flamsteed, first Astronomer Royal, born August 19.  Dr. Edmund Halley, second Astronomer Royal, born Oct. 27.  The Royal Society established in London July 15.  Foundation of the Royal Observatory at Greenwich laid Aug. 10.  Dr. James Bradley, third Astronomer Royal, born  The Treaty of Union between Eng. and Scotland, signed July 22.  Sir Isaac Newton died March 20th.  Planet Georgium Sidus, discovered by Dr. Herschel, March 13.   | 5343<br>5344<br>5899<br>6153<br>6230<br>6259<br>6259<br>6355<br>6359<br>6369<br>6375<br>6388<br>6405<br>6419<br>6440<br>6494<br>6496 | 4637<br>4638<br>5193<br>5447<br>5524<br>5553<br>5649<br>5653<br>5663<br>5669<br>5689<br>5713<br>5738<br>5788<br>5790                 | 690<br>691<br>1186<br>1440<br>1517<br>1546<br>1582<br>1642<br>1646<br>1656<br>1662<br>1675<br>1692<br>1706<br>1727<br>1781<br>1783         |
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| The Arabian Hegira, or flight of Mohammed  The Death of Mohammed  The Persian Yesdegird  The O, D, and Planets 1, 2, 3, 2, 3, in libra, seen from Earth The Art of Printing discovered  The Reformation begun by Martin Luther  Tycho Brahé born December 14th, at Knudstorp  The Kalendar corrected by Pope Gregory  Sir Isaac Newton born at Woolstrope in Lincolnshire, Dec. 25.  Mr. John Flamsteed, first Astronomer Royal, born August 19.  Dr. Edmund Halley, second Astronomer Royal, born Oct. 27.  The Royal Society established in London July 15.  Foundation of the Royal Observatory at Greenwich laid Aug. 10.  Dr. James Bradley, third Astronomer Royal, born  The Treaty of Union between Eng. and Scotland, signed July 22.  Sir Isaac Newton died March 20th.  Planet Georgium Sidus, discovered by Dr. Herschel, March 13.  Royal Society of Edinburgh incorporated  Louis XVI. King of France, guillotined January 21st.   | 5348<br>5344<br>5899<br>6153<br>6259<br>6259<br>6255<br>6355<br>6359<br>6369<br>6375<br>6388<br>6405<br>6440<br>6494<br>6496<br>6506 | 4697<br>4698<br>5193<br>5447<br>5524<br>5553<br>5589<br>5663<br>5669<br>5682<br>5692<br>5713<br>5734<br>5788<br>5790<br>5800<br>5800 | 690<br>631<br>1186<br>1440<br>1517<br>1546<br>1642<br>1646<br>1656<br>1662<br>1675<br>1692<br>1706<br>1727<br>1781<br>1783<br>1793<br>1793 |

TABLE XC. LOGISTIC LOGARITHMS.

| Minutes.         |                  |                  |                  |                           |                   |                  |                      |                              |                           |                              |              |  |
|------------------|------------------|------------------|------------------|---------------------------|-------------------|------------------|----------------------|------------------------------|---------------------------|------------------------------|--------------|--|
| Sec.             | 0                | 1                | 2                | 8                         | 4                 | 5                | 6                    | 7                            | 8                         | 9                            | 10           |  |
| 0                |                  | 1.7782           | 1.4771           | 1.3010                    | 1.1761            | 1.0792           | 1.0000               | 9331                         | 8751                      | 8239                         | 7782         |  |
| 1 2              | 3.5563           | 1.7710           | 1.4735           | 1.2986                    | 1.1743            | 1.0777           | 9988<br>9976         | 9320                         | 8742                      | 8231                         | 7774         |  |
| 3                | 3.2553<br>3.0792 | 1.7639<br>1.7570 | 1.4699           | 1.2962<br>1.2939          | 1.1723            | 1.0749           | 9964                 | 9310<br>9300                 | 8736<br>8724              | 8223<br>8215                 | 7767<br>7760 |  |
| 4                | 2.9542           | 1.7501           | 1.4629           | 1.2915                    | 1.1689            | 1.0794           | 9952                 | 9289                         | 8715                      | 8207                         | 7753         |  |
| 5                | 2.8573           | 1.7434           | 1.4594           | 1.2891                    | 1.1671            | 1.0720           | 9940                 | 9279                         | 8706                      | 819 <b>9</b>                 | 7745         |  |
| 6                | 2.7782           | 1.7368           | 1.4559           | 1.2868                    | 1.1654            | 1.0706           | 9928                 | 9269                         | 8697                      | 8191                         | 7738         |  |
| 8                | 2.7112<br>2.6532 | 1.7302<br>1.7238 | 1.4525           | 1.2845<br>1.2821          | 1.1636°<br>1.1619 | 1.0692           | 9916<br>9905         | 925 <b>9</b><br>924 <b>9</b> | 8688<br>8679              | 8183<br>8175                 | 7731<br>7724 |  |
| 9                | 2.6021           | 1.7175           | 1.4457           | 1.2798                    | 1.1601            | 1.0663           | 9893                 | 9238                         | 8670                      | 8167                         | 7717         |  |
| 10               | 2.5563           | 1.7112           | 1.4424           | 1.2775                    | 1.1584            | 1:0649           | 9881                 | 9228                         | 8661                      | 8159                         | 7710         |  |
| 11               | 2.5149           | 1.7050           | 1.4390           | 1.2753                    | 1.1566            | 1.0635           | 9869                 | 9218                         | 8652                      | 8152                         | 7703         |  |
| 12               | 2.4771           | 1.6990           | 1.4357           | 1.2730                    | 1.1549            | 1.0621           | 9858                 | 9208                         | 8643                      | 8144                         | 7696         |  |
| 13               | 2.4424           | 1.6930           | 1.4325           | 1.2707                    | 1.1532            | 1.0608           | 9846                 | 9198                         | 8635                      | 8136                         | 7688         |  |
| 14<br>15         | 2.4102<br>2.3802 | 1.6871<br>1.6812 | 1.4292           | 1.2685<br>1.2663          | 1.1515            | 1.0594<br>1.0580 | 9834<br>9823         | 9188<br>9178                 | 8626<br>8617              | 8128<br>8120                 | 7681<br>7674 |  |
| 16               | 2.3522           | 1.6755           | 1.4228           | 1.2640                    | 1.1481            | 1.0566           | 9811                 | 9168                         | 8608                      | 8112                         | 7667         |  |
| 17               | 2.3259           | 1.6698           | 1.4196           | 1.2618                    | 1.1464            | 1.0552           | 9800                 | 9158                         | 8599                      | 8104                         | 7660         |  |
| 18               | 2.3010           | 1.6642           | 1.4165           | 1.2596                    | 1.1447            | 1.0539           | 9788                 | 9148                         | 8591                      | 8097                         | 7653         |  |
| 19               | 2.2775           | 1.6587           | 1.4133           | 1.2574                    | 1.1430            | 1.0525           | 9777                 | 9138                         | 8582                      | 8089                         | 7646         |  |
| 20               | 2.2553           | 1.6532           | 1.4102           | 1.2553                    | 1.1413            | 1.0512           | 9765                 | 9128                         | 8573                      | 8081                         | 7639         |  |
| 21               | 2.2341           | 1.6478           | 1.4071           | 1.2531                    | 1.1397            | 1.0498           | 9754                 | 9119                         | 8565                      | 8078                         | 7632         |  |
| 22<br>23         | 2.2139<br>2.1946 | 1.6425           | 1.4040<br>1.4010 | 1.2510                    | 1.1380            | 1.0484           | 9742<br>9731         | 9109<br>9099                 | 8556<br>8547              | 8066<br>8058                 | 7625<br>7618 |  |
| 24               | 2.1761           | 1.6320           | 1.3979           | 1.2467                    | 1.1947            | 1.0458           | 9720                 | 9089                         | 8539                      | 8050                         | 7611         |  |
| 25               | 2.1584           | 1.6269           | 1.3949           | 1.2445                    | 1.1331            | 1.0444           | 9708                 | 9079                         | 8530                      | 8043                         | 7604         |  |
| 26               | 2.1413           | 1.6218           | 1.3919           | 1.2424                    | 1:1314            | 1.0431           | 9697                 | 9070                         | 8522                      | 8035                         | 7597         |  |
| 27<br>28         | 2.1249<br>2.1091 | 1.6168           | 1.3890           | 1.2403                    | 1.1298            | 1.0418<br>1.0404 | 9686<br>967 <i>5</i> | 9060<br>90 <i>5</i> 0        | 8513<br>8504              | 8027                         | 7590         |  |
| 29               | 2.0939           | 1.6069           | 1.3831           | 1.2362                    | 1.1266            | 1.0391           | 9664                 | 9041                         | 8496                      | 8020<br>8012                 | 7583<br>7577 |  |
|                  |                  |                  |                  | 1.2341                    |                   |                  |                      |                              |                           |                              |              |  |
| 30<br>31         | 2.0792<br>2.0649 | 1.6021           | 1.3802           | 1.2341                    | 1.1249            | 1.0378           | 9652<br>9641         | 9031<br>9021                 | 8487<br>8479              | 8004<br>7997                 | 7570<br>7563 |  |
| 32               | 2.0512           | 1.5925           | 1.8745           | 1:2300                    | 1.1217            | 1.0352           | 9630                 | 9012                         | 8470                      | 7989                         | 7556         |  |
| 33               | 2.0378           | 1.5878           | 1.3716           | 1.2279                    | 1.1201            | 1.0339           | 9619                 | 9002                         | 8462                      | 7981                         | 7549         |  |
| 34               | 2.0248           | 1.5832           | 1.3688           | 1.2259                    | 1.1186            | 1.0326           | 9608                 | 8992                         | 8453                      | 7974                         | 7542         |  |
| 35<br>36         | 2.0122           | 1.5786<br>1.5740 | 1.3660           | 1.2239                    | 1.1170            | 1,0313           | 9597<br>9586         | 8983<br>8973                 | 8 <del>44</del> 5<br>8437 | 7966<br>7959                 | 7535<br>7528 |  |
| 37               | 1.9881           | 1.5695           | 1.3604           | 1.2198                    | 1.1138            | 1.0287           | 9575                 | 8964                         | 8428                      | 7951                         | 7522         |  |
| 88               | 1.9765           | 1.5651           | 1.3576           | 1.2178                    | 1.1123            | 1.0274           | 9564                 | 8954                         | 8420                      | 7944                         | 7515         |  |
| 39               | 1.9652           | 1.5607           | 1.9549           | 1.2159                    | 1.1107            | 1.0261           | 9553                 | 8945                         | 8411                      | 7936                         | 7508         |  |
| 40               | 1.9542           | 1.5563           | 1.3522           | 1.2139                    | 1.1091            | 1.0246           | 9542                 | 8935                         | 8403                      | 7929                         | 7501         |  |
| 41               | 1.9495           | 1.5520           | 1.3495           | 1.2119                    | 1.1076            | 1.0235           | 9532                 | 8926                         | 8395                      | 7921                         | 7494         |  |
| 42               | 1.9931           | 1.5477           | 1.3468           | 1.2099                    | 1.1061            | 1.0223           | 9521                 | 8917                         | 8386                      | 7914                         | 7488         |  |
| 43<br>44         | 1.9228           | 1.5435           | 1.3441           | 1.2080                    | 1.1045            | 1.0210           | 9510<br>9499         | 8907<br>8898                 | 8378<br>8870              | 7906<br>7899                 | 7481<br>7474 |  |
| 45               | 1.9031           | 1.5351           | 1.5388           | 1.2041                    | 1.1015            | 1.0185           | 9488                 | 8888                         | 8361                      | 7891                         | 7467         |  |
| 46               | 1.8935           | 1.5310           | 1.3362           | 1.2022                    | 1.0999            | 1.0172           | 9478                 | 8879                         | 8353                      | 788 <del>4</del>             | 7461         |  |
| 47               | 1.8842           | 1.5269           | 1.3336           | 1.2003                    | 1.0984            | 1.0160           | 9467                 | 8870                         | 8345                      | 7877                         | 7454         |  |
| 48<br>49         | 1.8751           | 1.5229           | 1.3310           | 1.1984                    | 1.0969            | 1.0147           | 9456<br>9446         | 8861<br>8851                 | 8337<br>8328              | 7869<br>7862                 | 7447<br>7441 |  |
|                  |                  |                  |                  |                           |                   |                  |                      | <u> </u>                     |                           | <u> </u>                     | <u> </u>     |  |
| 50<br>51         | 1.8573           | 1.5149           | 1.3259           | 1.1946<br>1. <b>1</b> 927 | 1.0939            | 1.0122           | 9435<br>9425         | 8842<br>8833                 | 8320<br>8312              | 785 <b>5</b><br>78 <b>47</b> | 7434<br>7427 |  |
| 52               | 1.8403           | 1.5071           | 1.3238           | 1.1908                    | 1.0909            | 1.0098           | 9414                 | 8824                         | 8504                      | 7840                         | 7421         |  |
| 53               | 1.8320           | 1.5032           | 1.3183           | 1.1889                    | 1.0894            | 1.0085           | 9404                 | 8814                         | 8296                      | 7832                         | 7414         |  |
| <b>54</b>        | 1.8239           | 1.4994           | 1,3158           | 1.1871                    | 1.0880            | 1.0073           | 9393                 | 8805                         | 8288                      | 7825                         | 7407         |  |
| 55<br>se         | 1.8159           | 1.4956           | 1.3133           | 1.1852                    | 1.0865            | 1.0061           | 9383                 | 8796<br>8787                 | 8279<br>8271              | 7818                         | 7401         |  |
| 5 <b>6</b><br>57 | 1,8081           | 1.4918           | 1.3108           | 1.1834                    | 1.0850            | 1.0049           | 9372                 | 8778                         | 8263                      | 7811<br>7803                 | 7394<br>7387 |  |
| 58               | 1.7929           | 1.4844           | 1.3059           | 1.1797                    | 1.0821            | 1.0024           | 9351                 | 8769                         | 8255                      | 7796                         | 7381         |  |
| <b>59</b>        | 1.7855           | 1.4808           | 1.3034           | 1.1779                    | 1.0806            | 1.0012           | 9341                 | 8760                         | 8247                      | 7789                         | 7374         |  |
| Sec.             | 0                | 60               | 120              | 180                       | 240               | 300              | 360                  | 420                          | 480                       | 540                          | 600          |  |
|                  |                  | ·                | <b>!</b>         | ····                      | Secon             |                  |                      |                              |                           |                              |              |  |
|                  |                  |                  |                  |                           |                   |                  |                      |                              |                           |                              |              |  |

## TABLE XC. LOGISTIC LOGARITHMS.

|          | Minutes.     |              |                      |              |              |              |                   |              |              |              |              |              |              |                      |
|----------|--------------|--------------|----------------------|--------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------------|
| Sec.     | 111          | 12           | 13                   | 14           | 15           | 16           | 17                | 18           | 19           | 20           | 21           | 22           | 23           | 24                   |
| 1        | ·            |              |                      |              |              |              |                   |              |              |              |              |              |              |                      |
| 1        | 7368<br>7361 | 6990<br>6984 | 6642                 | 6320         | 6021         | 5740         | 5477              | 5229         | 4994         | 4771         | 4559         | 4357         | 4164         | 3979                 |
| 2        | 7354         | 6978         | 6637                 | 6315         | 6016         | 5736         | 5478              | 5225         | 4990         | 4768         | 4556         | 4354         | 4161         | 3976,                |
| 3        | 7348         | 6972         | 6625                 | 6310<br>6305 | 6006         | 5731<br>5727 | 5469              | 5221         | 4986         | 4764<br>4760 | 4552<br>4549 | 4351<br>4347 | 4158<br>4155 | 3973<br>3970         |
| 4        | 7341         | 6966         | 6620                 | 6300         | 6001         | 5722         | 5464<br>5460      | 5217<br>5213 | 4983<br>4979 | 4757         | 4546         | 4344         | 4152         | 3967                 |
| 5        | 7335         | 6960         | 6614                 | 6294         | 5997         | 5718         | 5456              | 5209         | 4975         | 4753         | 4542         | 4941         | 4149         | 3964                 |
| 6        | 7328         | 6954         | 6609                 | 6289         | 5992         | 5713         | 5452              | 5205         | 4971         | 4750         | 4539         | 4338         | 4145         | 3961                 |
| 7        | 7322         | 6948         | 6603                 | 6284         | 5987         | 5709         | 5447              | 5201         | 4967         | 4746         | 4535         | 4334         | 4142         | 3958                 |
| 8        | 7315         | 6942         | 6598                 | 6279         | 5982         | 5704         | 5443              | 5197         | 4964         | 4742         | 4532         | 4331         | 4139         | 395 <b>5</b>         |
| 9        | 7309         | 6936         | €592                 | 6274         | 5977         | 5700         | 5489              | 5199         | 4960         | 4739         | ,4528        | 4328         | 4136         | 3952                 |
| 10       | 7302         | 6930         | 6587                 | 6269         | 5973         | 5695         | 5435              | 5189         | 4956         | 4735         | 4525         | 4325         | 4133         | 3949                 |
| 11       | 7296         | 6924         | 6581                 | 6264         | 5968         | 5691         | 5430              | 5185         | 4952         | 4732         | 4522         | 4321         | 4130         | 3946                 |
| 12       | 7289         | 6918         | 6576                 | 6259         | 5963         | 5686         | 5426              | 5181         | 4949         | 4728         | 4518         | 4318         | 4127         | 3943                 |
| 13       | 7283         | 6912         | 6570                 | 6254         | 5958         | 5682         | 5422              | 5177         | 4945         | 4724         | 4515         | 4315         | 4124         | 3940                 |
| 14       | 7276         | 6906         | 6565                 | 6248         | 5954         | 5677         | 5418              | 5173         | 4941         | 4721         | 4511         | 4311         | 4120         | S937                 |
| 15       | 7270         | 6900         | 6559                 | 6243         | 5949         | 5673         | 5414              | 5169         | ·4937        | 4717         | 4508         | 4308         | 4117         | 3934                 |
| 16<br>17 | 7264         | 6894         | 6554                 | 6238         | 5944         | 5669         | 5409              | 5165         | 4933         | 4714         | 4505         | 4305         | 4114         | 3931                 |
| 18       | 7257<br>7251 | 6888<br>6882 | 6548                 | 6233         | 5939         | 5664         | 5405              | 5161         | 4930         | 4710         | 4501         | 4302         | 4111         | 3928                 |
| 19       | 7244         | 6877         | 6543<br>6538         | 6228         | 5935         | 5660         | 5401              | 5157         | 4926         | 4707         | 4498         | 4298         | 4108         | 3925                 |
| ·        | 1            |              | 0000                 | 6223         | 5930         | 5655         | 5397              | 5153         | 4922         | 4703         | 4494         | 4295         | 4105         | 3922                 |
| 20       | 7238         | 6871         | 6532                 | 6218         | 5925         | 5651         | 5393              | 5149         | 4918         | 4699         | 4491         | 4292         | 4102         | 3919                 |
| 21       | 7232         | 6865         | 6527                 | 6213         | 5920         | 5646         | 5389              | 5145         | 4915         | 4696         | 4488         | 4289         | 4099         | 3917                 |
| 22<br>23 | 7225         | 6859         | 6521                 | 6208         | 5916         | 5642         | 5384              | 5141         | 4911         | 4692         | 4484         | 4285         | 4096         | 3914                 |
| 23       | 7219         | 6853         | 6516                 | 6203         | 5911         | 5637         | 5380              | 5137         |              | 4689         | 4481         | 4282         | 4092         | 3911                 |
| 25       | 7212<br>7206 | 6847<br>6841 | 6510<br>6505         | 6198         | 5906         | 5688         | 5376              | 5133         |              | 4685         | 4477         | 4279         | 4089         | 3908                 |
| 26       | 7200         | 6836         | 6500                 | 6193<br>6188 | 5902         | 5629         | 5372              | 5129         | 4900         | 4682         | 4474         | 4276         | 4086         | 3905                 |
| 27       | 7193         | 6830         | 6494                 | 6183         | 5897<br>5892 | 5624<br>5620 | 5368<br>5364      | 5125<br>5122 | 4896<br>4892 | 4678<br>4675 | 4471<br>4467 | 4273<br>4269 | 4083<br>4080 | 390 <b>2</b><br>3899 |
| 28       | 7187         | 6824         | 6489                 | 6178         | 5888         | 5615         | 5359              | 5118         | 4889         | 4671         | 4464         | 4266         | 4077         | 3896                 |
| 29       | 7181         | 6818         | 6484                 | 6173         | 5883         | 5611         | 5355              | 5114         | 4885         | 4668         | 4460         | 4263         | 4074         | 3893                 |
| 30       | 7175         | 6812         | 6478                 |              |              |              | !                 |              |              | !            |              |              |              |                      |
| 31       | 7168         | 6807         | 6473                 | 6168<br>6163 | 5878<br>5874 | 5607<br>5602 | 5351<br>5347      | 5110<br>5106 | 4881<br>4877 | 4664<br>4660 | 4457<br>4454 | 4260<br>4256 | 4071         | 3890<br>3887         |
| 32       | 7162         | 6801         | 6467                 | 6158         | 5869         | 5598         | 5343              | 5100         |              | 4657         | 4450         | 4253         | 4068<br>4065 | 3884                 |
| 53       | 7156         | 6795         | 6462                 | 6153         | 5864         | 5594         | 5339              | 5098         |              | 4653         | 4447         | 4250         | 4062         | 3881                 |
| 34       | 7149         | 6789         | 6457                 | 6148         | 5860         | 5589         | 5335              | 5094         |              | 4650         | 4444         | 4247         | 4059         | 3878                 |
| 35       | 7143         | 6784         | 6451                 | 6143         | 5855         | 5585         | 5331              | 5090         |              | 4646         | 4440         | 4244         | 4055         | 3875                 |
| 36       | 7137         | 6778         | 6446                 | 6138         | 5850         |              | 5326              | 5086         | 4859         | 4643         | 4437         | 4240         | 4052         | 3872                 |
| 37       | 7131         | 6772         | 6441                 | 6133         | 5846         | 5576         | 5322              | 5082         |              | 4639         | 4434         | 4237         | 4049         | 3869                 |
| 38       | 7124         | 6766         | 6435                 | 6128         | 5841         | 5572         | 5318              | 5079         | 4852         | 4636         | 4430         | 4234         | 4046         | 3866                 |
| 33       | 7118         | 6761         | 6430                 | 6123         | 5836         | 5567         | 5314              | <b>5</b> 075 | 4848         | 4632         | 4427         | 4231         | 4043         | <b>3</b> 863         |
| 40       | 7112         | 6755         | G425                 | 6118         | 5832         | 5563         | 5310              | 5071         | 4844         | 4629         | 4424         | 4228         | 4040         | 3860                 |
| 41       | 7106         | 6749         | 6420                 | 6113         | 5827         | 5559         | 5306              | 5067         | 4841         | 4625         | 4420         | 4224         | 4037         | 3857                 |
| 42       | 7100         | 6743         | 6414                 | 6108         | 5823         | 5554         | 5302              | 5063         | 4837         | 4622         | 4417         | 4221         | 4034         | 3855                 |
| 43       | 7093         | 6738         | 6409                 | 6103         | 5818         | <i>555</i> 0 | 5298              | 5059         | 4833         | 4618         | 4414         | 4218         | 4031         | 3852                 |
| 44<br>45 | 7087<br>7081 | 6732<br>6726 | 6404                 | 6099         | 5813         | 5546         | 5294              | 5055         | 4830         | 4615         | 4410         | 4215         | 4028         | 3849                 |
| 46       | 7075         | 6721         | 6398<br>63 <b>93</b> | 6094<br>6089 | 5809<br>5804 | 5541         | 5290<br>5285      | 5051<br>5048 | 4826<br>4822 | 4611         | 4407         | 4212         | 4025         | 3846                 |
| 47       | 7069         | 6715         | 6388                 | 6084         | 5804<br>5800 | 5537<br>5533 | 5285<br>5281      | 5048<br>5044 | 4822<br>4819 | 4608<br>4604 | 4404<br>4400 | 4209<br>4205 | 4022<br>4019 | 3843<br>3840         |
| 48       | 7063         | 6709         | 6383                 | 6079         | 5795         | 5528         | 5277              | 5040         | 4815         | 4601         | 4397         | 4202         | 4016         | 3837                 |
| 49       | 7057         | 6704         | 6377                 | 6074         | 5790         | 552 <b>4</b> | 5273              | 5036         | 4811         | 4597         | 4394         | 4199         | 4013         | 3834                 |
| 50       | 7050         | 6698         |                      |              |              |              |                   |              |              |              | <u>!</u>     |              |              |                      |
| 51       | 7030         | 6692         | 6372<br>6367         | 6069<br>6064 | 5786<br>5781 | 5520<br>5516 | 5269<br>5265      | 5032         | 4808         | 4594         | 4390<br>4387 | 4196         | 4010         | 3831                 |
| 52       | 7038         | 6687         | 6362                 | 6059         |              |              | 5261              | 5028<br>5025 | 4804<br>4800 | 4590<br>4587 |              | 4193         | 4007         | 3828                 |
| 53       | 7032         | 6681         | 6357                 | 6055         | 5777<br>5772 |              | 5257              | 5025         |              | 4587<br>4584 |              | 4189<br>4186 |              | 3825<br>3829         |
| 54       | 7026         | 6676         | 6351                 | 6059         | 5768         |              | 5253              |              | 4793         | 4580         |              | 4183         |              | 3820                 |
| 55       | 7020         | 6670         | 6346                 | 6045         | 5763         | 5498         | 5249              |              | 4789         | 4577         |              | 4180         |              | 3817                 |
| 56       | 7014         | 6664         | 6341                 | 6040         |              | 5494         | 52 <del>4</del> 5 |              | 4786         | 4573         | 4370         | 4177         |              | 3814                 |
| 57       | 7008         | 6659         | 6336                 | 6035         | 5754         | 5490         | 5241              | 5005         | 4782         | 4570         | 4367         | 4174         | 3988         | 3811                 |
| 58       | 7002         | 6653         | 6331                 | 6030         | 5749         |              | 5237              |              | 4778         | 4566         |              | 4171         |              | 3808                 |
| 59       | 6996         | 6648         | 6325                 | 6025         | 5745         | <i>5</i> 481 | 5233              | 4998         | 4775         | 4563         | 4361         | 4167         | 3982         | 3805                 |
| Sec.     | 660          | 720          | 780                  | 840          | 900.         | 960          | 1020              | 1080         | 1140         | 1200         | 1260         | 1320         | 1380         | 1440                 |
|          |              |              |                      |              |              |              | Second            |              |              |              |              |              |              |                      |
| L        |              |              | <u> </u>             |              |              |              |                   |              |              |              |              |              |              |                      |

TABLE XC. LOGISTIC LOGARITHMS.

|          |               | Minutes.     |                      |              |                      |              |              |              |              |              |              |              |              |
|----------|---------------|--------------|----------------------|--------------|----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Sec.     | 25            | 26           | 27                   | 28           | 29                   | 30           | 31           | 32           | 33           | 34           | 35           | 36           | 37           |
| 0        | 3803          | 3632         | 3468                 | 3310         | 3158                 | 3010         | 2868         | 2730         | 2596         | 2467         | 2841         | 2218         | 2099         |
| i        | 3799          | 3629         | 3465                 | 3307         | 3155                 | 3008         | 2866         | 2728         | 2594         | 2465         | 2339         | 2216         | 2098         |
| 2        | 3796          | 3626         | 3463                 | 3305         | 3153                 | 3005         | 2863         | 2725         | 2592         | 2462         | 2337         | 2214         | 2096         |
| 3        | 3793          | 362 <b>3</b> | 3460                 | 3302         | 3150                 | 3003         | 2861         | 2723         | 2590         | 2460         | 2335         | 2212         | 2094         |
| 4        | 3791          | 3621         | 3457                 | 3300         | 3148                 | 3001         | 2859         | 2721         | 2588         | 2458         | 2333         | 2210         | 2092         |
| . 5      | 3788          | 3618         | 3454                 | 3297         | 3145                 | 2998         | 2856         | 2719         | 2585         | 2456         | 2331         | 2208         | 2090         |
| 6 7      | 3785<br>3782  | 3615<br>3612 | 3452<br>3449         | 3294         | 3143                 | 2996<br>2993 | 2854<br>2852 | 2716         | 2583         | 2454<br>2452 | 2328<br>2326 | 2206<br>2204 | 2088<br>2086 |
| 8        | 3779          | 3610         | 3446                 | 3292<br>3289 | 3140<br>3138         | 2991         | 2849         | 2714<br>2712 | 2581<br>2579 | 2450         | 2324         | 2202         | 2084         |
| 9        | 3776          | 3607         | 3444                 | 3287         | 3135                 | 2989         | 2847         | 2710         | 2577         | 2448         | 2322         | 2200         | 2082         |
|          |               |              |                      |              |                      |              |              |              |              |              |              |              |              |
| 10<br>11 | 3773<br>3770  | 3604<br>3601 | 3441<br>3438         | 3284         | 3133                 | 2986<br>2984 | 2845<br>2842 | 2707<br>2705 | 2574         | 2445<br>2443 | 2320<br>2318 | 2198<br>2196 | 2080<br>2078 |
| 12       | 3768          | 3598         | 3436                 | 3282<br>3279 | 3130<br>3128         | 2981         | 2840         | 2703         | 2572<br>2570 | 2441         | 2316         | 2194         | 2076         |
| 13       | 3765          | 3596         | 3433                 | 3276         | 3125                 | 2979         | 2838         | 2701         | 2568         | 2439         | 2314         | 2192         | 2074         |
| 14       | 3762          | 3593         | 3431                 | 3274         | 3123                 | 2977         | 2835         | 2698         | 2566         | 2437         | 2312         | 2190         | 2072         |
| 15       | 3759          | 3590         | 3428                 | 3271         | 3120                 | 2974         | 2833         | 2696         | 2564         | 2435         | 2310         | 2188         | 2070         |
| 16       | 3756          | 8587         | 3425                 | 3269         | 3118                 | 2972         | 2831         | 2694         | 2561         | 2493         | 2308         | 2186         | 2068         |
| 17       | 3753          | 3585         | 3423                 | 3266         | 3115                 | 2969         | 2828         | 2692         | 2559         | 2431         | 2306         | 2184         | 2066         |
| 18       | 3750          | 3582         | 3420                 | 3264         | 3113                 | 2967         | 2826         | 2689         | 2557         | 2429         | 2304         | 2182         | 2064         |
| 19       | 3747          | 3579         | 3417                 | 3261         | 3110                 | 2965         | 2824         | 2687         | 2555         | 2426         | 2302         | 2180         | 2062         |
| 20       | 3745          | 3576         | 3415                 | 3259         | 3108                 | 2962         | 2821         | 2685         | 2553         | 2424         | 2300         | 2178         | 2061         |
| 21       | 3742          | 3574         | .3412                | 3256         | 3105                 | 2960         | 2819         | 2683         | 2551         | 2422         | 2298         | €176         | 2059         |
| 22       | 3739          | 3571         | 3409                 | 3253         | 3103                 | 2958         | 2817         | 2681         | 2548         | 2420         | 2296         | 2174         | 2057         |
| 23       | 3736          | 3568         | 3407                 | 3251         | 3101                 | 2955         | 2815         | 2678         | 2546         | 2418         | 2294         | 2172         | 2055         |
| 24       | 3733          | 3565<br>3563 | 3404                 | 3248         | 9098                 | 2953         | 2812         | 2676         | 2544         | 2416         | 2291         | 2170         | 2053         |
| 25<br>26 | 3730<br>3727  | 3560         | 3401<br>3399         | 3246<br>3243 | 3096<br>3093         | 2950<br>2948 | 2810<br>2808 | 2674<br>2672 | 2542<br>2540 | 2414<br>2412 | 2289<br>2287 | 2169<br>2167 | 2051<br>2049 |
| 27       | 3725          | 3557         | 8396                 | 3243         | 3093                 | 2946         | 2805         | 2669         | 2538         | 2410         | 2285         | 2165         | 2047         |
| 28       | 3722          | 3555         | 3393                 | 3238         | 3088                 | 2943         | 2803         | 2667         | 2535         | 2408         | 2283         | 2163         | 2045         |
| 29       | 3719          | 3552         | 3391                 | 3236         | 3086                 | 2941         | 2801         | 2665         | 2533         | 2405         | 2281         | 2161         | 2043         |
| 90       | 0716          | 3549         | 3388                 | 2000         |                      | 2939         | 9709         | 0669         | 0501         | 0400         | 9970         | 91 50        | 2041         |
| 30       | 3716<br>3713  | 3546         | 3386                 | 3233<br>3231 | 3083<br>3081         | 2939         | 2798<br>2796 | 2663<br>2660 | 2531<br>2529 | 2403<br>2401 | 2279<br>2277 | 2159<br>2157 | 2039         |
| 32       | 3710          | 3544         | 3383                 | 3228         | 3078                 | 2934         | 2794         | 2658         | 2527         | 2399         | 2275         | 2155         | 2037         |
| 23       | 3708          | 3541         | 3380                 | 3225         | 3076                 | 2931         | 2792         | 2656         | 2525         | 2397         | 2273         | 2153         | 2035         |
| 34       | 3705          | 3538         | 3378                 | 3 <b>223</b> | 3073                 | 2929         | 2789         | 2654         | 2522         | 2395         | 2271         | 2151         | 2033         |
| 35       | 3702          | 3535         | 3375                 | 8220         | 3071                 | 2927         | 2787         | 2652         | 2520         | 2393         | 2269         | 2149         | 2032         |
| 36       | 3699          | 353 <b>3</b> | 3372                 | 3218         | 3069                 | 2924         | 2785         | 2649         | 2518         | 2391         | 2267         | 2147         | 2030         |
| 37       | 3696          | 3530         | 3370                 | 3215         | 3066                 | 2922         | 2782         | 2647         | 2516         | 2389         | 2265         | 2145         | 2028         |
| 38       | 3693          | 3527<br>3525 | 3367                 | 3213         | 3064                 | 2920<br>2917 | 2780<br>2778 | 2645         | 2514         | 2387         | 2263         | 2143         | 2026<br>2024 |
| 39       | 3691          | 3525         | 3365                 | 3210         | 3061                 | 2917         | 2110         | 2643         | 2512         | 2384         | 2261         | 2141         | 2024         |
| 40       | 3688          | 3522         | 3362                 | 3208         | 3059                 | 2915         | 2775         | 2640         | 2510         | 2382         | 2259         | 2139         | 2022         |
| 41       | 3685          | 3519         | 3359                 | 3205         | 3056                 | 2912         | 2773         | 2638         | 2507         | 2380         | 2257         | 2137         | 2020         |
| 42       | 3682          | 3516         | 3357                 | 3203         | 3054                 | 2910         | 2771         | 2636         | 2505         | 2378         | 2255         | 2135         | 2018         |
| 43       | 3679          | 3514<br>3511 | 3354                 | 3200         | 3052                 | 2908<br>2905 | 2769<br>2766 | 2634         | 2503         | 2376         | 2253         | 2133         | 2016         |
| 44<br>45 | 3677<br>3674  | 3508         | 3351<br>3549         | 3198<br>3195 | 3049.<br>3047        | 2903         | 2764         | 2632<br>2629 | 2501<br>2499 | 2374<br>2372 | 2251<br>2249 | 2131<br>2129 | 2014<br>2012 |
| 46       | 3671          | 3506         | 3346                 | 3193         | 3044                 | 2901         | 2762         | 2627         | 2497         | 2370         | 2247         | 2127         | 2010         |
| 47       | 3668          | 3503         | 3344                 | 3190         | 3042                 | 2898         | 2760         | 2625         | 2494         | 2368         | 2245         | 2125         | 2009         |
| 48       | 3665          | 3500         | 9341                 | 3188         | 3039                 | 2896         | 2757         | 2623         | 2492         | 2366         | 2243         | 2123         | 2007         |
| 49       | 3663          | 3497         | 3338                 | 3185         | 3037                 | 2894         | 2755         | 2621         | 2490         | 2564         | 2241         | 2121         | 2005         |
| 50       | 3660          | 3495         | 3336                 | 3183         | 3034                 | 2891         | 2753         | 2618         | 2488         | 2362         | 2239         | 2119         | 2003         |
| 51       | 3€ <b>5</b> 7 | 3492         | 3333                 | 3180         | 3032                 | 2889         | 2750         | 2616         | 2486         | 2359         | 2237         | 2117         | 2001         |
| 52       | 3654          | 3489         | 3331                 | 3178         | 3030                 | 2887         | 2748         | 2614         | 2484         | 2357         | 2235         | 2115         | 1999         |
| 58       | 3651          | 3487         | 3328                 | 3175         | 3027                 | 2884         | 2746         | 2612         | 2482         | 2355         | 2233         | 2113         | 1997         |
| 54       | 8649          | 3484         | 3325                 | 3173         | 3025                 | 2882         | 2744         | 2610         | 2480         | 2353         | 2231         | 2111         | 1995         |
| 55       | 3646          | 3481         | 3323                 | 3170         | 3022                 | 2880         | 2741         | 2607         | 2477         | , 2351       | 2229         | 2109         | 1993         |
| 56       | 3643          | 3479         | 3320                 | 3168         | 3020                 | 2877         | 2739         | 2605         | 2475         | 2349         | 2227         | 2107         | 1991         |
| 57       | 3640          | 3476         | 3318                 | 3165         | 3018                 | 2875         | 2737         | 2603         | 2473         | 2347         | 2225         | 2105         | 1989         |
| 58       | 3637          | S473         | 331 <i>5</i><br>3313 | 3163         | 301 <i>5</i><br>3013 | 2873<br>2870 | 2735<br>2732 | 2601<br>2599 | 2471         | 2945         | 2223         | 2103         | 1987         |
| 59       | 3635          | 3471         |                      | 3160         |                      |              |              | 2099         | 2469         | 2343         | 2220         | 2101         | 1986         |
| Sec.     | 1500          | 1560         | 1620                 | 1680         | 1740                 | 1800         | 1860         | 1920         | 1980         | 2040         | 2100         | 2160         | 2220         |
|          |               |              |                      |              |                      | Se           | conds.       |              | _            |              | <b></b>      |              |              |

TABLE XC. LOGISTIC LOGARITHMS.

|          | LOGISTIC LOGARITHMS,  Minutes. |              |              |              |                       |                       |               |              |              |              |             |               |                     |          |
|----------|--------------------------------|--------------|--------------|--------------|-----------------------|-----------------------|---------------|--------------|--------------|--------------|-------------|---------------|---------------------|----------|
| Sec.     | 38                             | 39           | 40           | 41           | 42                    | 43                    | 44            | 45           | 46           | 47           | 48          | 49            | 50                  | <u> </u> |
|          | <del></del>                    |              |              |              |                       |                       |               |              |              |              |             |               |                     | -        |
| 0        | 1984                           | 1871         | 1761<br>1759 | 1654<br>1652 | 1549<br>1547          | 1447<br>1445          | 1947<br>1945  | 1249<br>1248 | 1154<br>1152 | 1061<br>1059 | 969         | 880           | 792<br>790          | 1        |
| 1 2      | 1982                           | 1869<br>1867 | 1757         | 1650         | 1546                  | 1443                  | 1343          | 1246         | 1151         | 1057         | 966         | 877           | 789                 | 1        |
| 3        | 1978                           | 1865         | 1755         | 1648         | 1544                  | 1442                  | 1342          | 1245         | 1149         | 1056         | 965         | 875           | 737                 |          |
| 4        | 1976                           | 1863         | 1754         | 1647         | 1542                  | 1440                  | 1340          | 1243         | 1148         | 1054         | 963         | 874           | 786                 | 1:       |
| 5        | 1974                           | 1862         | 1752         | 1645         | 1540                  | 1438                  | 1339          | 1241         | 1146         | 105.3        | 902         | 872           | 785                 | (        |
| 6        | 1972                           | 1860         | 1750         | 1649         | 1539                  | 1437                  | 1337          | 1240         | 1145         | 1051         | 960         | 871           | 783                 | 1        |
| 7        | 1970                           | 1858         | 1748         | 1641<br>1640 | 1537<br>1535          | 1495<br>1433          | 1935          | 1238<br>1237 | 1143         | 1050         | 959<br>957  | 869<br>868    | 782<br>780          | 6        |
| 8 9      | 1968<br>1967                   | 1856<br>1854 | 1746<br>1745 | 1638         | 1534                  | 1433                  | 1334<br>1332  | 1235         | 1140         | 1047         | 956         | 866           | . 779               | i        |
|          |                                |              |              |              |                       |                       |               |              |              |              |             |               |                     | <b> </b> |
| 10       | 1965                           | 1852         | 1743         | 1636         | 1532                  | 1430                  | 1331          | 1233         | 1138         | 1045         | 954<br>953  | 865<br>863    | 777                 | 1        |
| 11       | 1963<br>1961                   | 1850<br>1849 | 1741<br>1739 | 1634<br>1633 | 1530<br>1528          | 1428<br>1427          | 1329<br>1327  | 1232         | 1137         | 1042         | 951         | 862           | 774                 | 6        |
| 13       | 1959                           | 1847         | 1737         | 1631         | 1527                  | 1425                  | 1326          | 1229         | 1134         | 1041         | 950         | 860           | 773                 | i        |
| 14       | 1957                           | 1845         | 1736         | 1629         | 1525                  | 1423                  | 1324          | 1227         | 1132         | 1039         | 948         | 859           | 772                 | E        |
| 1.5      | 1955                           | 1843         | 1734         | 1627         | 1523                  | 1422                  | 1322          | 1225         | 1130         | 1037         | 947         | 857           | 770                 | 1        |
| 16       | 1953                           | 1841         | 1732         | 1626         | 1522                  | 1420                  | 1321          | 1224         | 1129         | 1036         | 945         | 856           | 769                 | 1        |
| 17       | 1951                           | 1839         | 1730         | 1624<br>1622 | 1520                  | 1418                  | 1319          | 1222         | 1127         | 1034         | 944         | 855<br>853    | 767<br>7 <b>6</b> 6 | 1        |
| 18       | 1950<br>1948                   | 1838<br>1836 | 1728<br>1727 | 1620         | 1513<br>1516          | 1417                  | 1317<br>1316  | 1221<br>1219 | 1124         | 1033         | 941         | 852           | 764                 | 1        |
|          |                                |              |              |              |                       |                       |               |              |              |              |             |               |                     | -        |
| 20       | 1946                           | 1834         | 1725         | 1619         | 1515                  | 1413                  | 1314          | 1217         | 1123         | 1030         | 939         | 850           | 763                 |          |
| 21       | 1943<br>1942                   | 1832<br>1830 | 1723<br>1721 | 1617<br>1615 | 1513<br>1511          | 1412                  | 1 <b>3</b> 13 | 1216<br>1214 | 1121         | 1028<br>1027 | 638<br>936  | 849<br>847    | 762<br>760          | 6        |
| 22       | 1940                           | 1828         | 1719         | 1613         | 1510                  | 1408                  | 1309          | 1213         | 1118         | 1025         | 935         | 846           | 759                 | i        |
| 24       | 1938                           | 1827         | 1718         | 1612         | 1508                  | 1407                  | 1308          | 1211         | 1116         | 1024         | 933         | 844           | 757                 | i        |
| 25       | 1936                           | 1825         | 1716         | 1610         | 1506                  | 1405                  | 1306          | 1209         | 1115         | 1022         | 932         | 843           | 756                 | 1        |
| 26       | 1934                           | 1823         | 1714         | 1608         | 1504                  | 1403                  | 1304          | 1208         | 1113         | 1021         | 930         | 841           | 754                 | 1        |
| 27       | 1933                           | 1821         | 1712         | 1606         | 1503                  | 1402                  | 1303          | 1206         | 1112         | 1019         | 929         | 840           | 753                 | 1        |
| 28       | 1931                           | 1819<br>1817 | 1711         | 1605<br>1603 | 1 <i>5</i> 01<br>1439 | 1400                  | 1301<br>1300  | 1205         | 1110         | 1018         | 927<br>926  | 838           | 751<br>750          | 1        |
| 29       |                                | 1011         |              |              | 1439                  | 1398                  | 1300          |              |              |              |             |               |                     | -        |
| 30       | 1927                           | 1816         | 1707         | 1601         | 1498                  | 1397                  | 1298          | 1201         | 1107         | 1015         | 924         | 835           | 749                 |          |
| 31       | 1925                           | 1814         | 1705         | 1599         | 1496                  | 1395                  | 1296          | 1200         | 1105         | 1013         | 923         | 834<br>833    | 747                 | 1        |
| 32<br>33 | 1923                           | 1812<br>1810 | 1703         | 1598<br>1596 | 1494<br>1493          | 1393<br>13 <b>9</b> 2 | 1295<br>1293  | 1198         | 1104         | 1010         | 920         | 831           | 746<br>744          | 6        |
| 34       | 1919                           | 1808         | 1700         | 1594         | 1491                  | 1390                  | 1291          | 1195         | 1101         | 1008         | 918         | 830           | 743                 | è        |
| 9 35     | 1918                           | 1806         | 1698         | 1592         | 1489                  | 1388                  | 1290          | 1193         | 1099         | 1007         | 917         | 828           | 741                 | •        |
| 36       | 1916                           | 1805         | 1696         | 1591         | 1487                  | 1387                  | 1288          | 1192         | 1098         | 1005         | 915         | 827           | 740                 | (        |
| 37       | 1914                           | 1803         | 1694         | 1589         | 1486                  | 1885                  | 1287          | 1190         | 1096         | 1004         | 914         | 825           | 739                 | 1        |
| 38       | 1912                           | 1801         | 1692         | 1587         | 1484                  | 1383                  | 1285          | 1189         | 1095         | 1002         | 912         | 824<br>822    | 737                 | 1        |
| 39       | 1910                           | 1799         | 1691         | 1585         | 1482                  | 1382                  | 1283          | 1187         | 1093         | <del></del>  | 311         |               | 736                 | -        |
|          | 1908                           | 1797         | 1689         | 1584         | 1481                  | 1380                  | 1282          | 1186         | 1091         | 999          | 909         | 821           | 734                 | 6        |
| 41       | 1906                           | 1795         | 1687         | 1582         | 1479                  | 1378                  | 1280          | 1184         | 1090         | 998          | 908         | 819<br>818    | 753                 | 6        |
| 42<br>43 | 1904                           | 1794<br>1792 | 1686<br>1684 | 1580<br>1578 | 1477<br>1476          | 1377<br>1375          | 1278<br>1277  | 1182         | 1088         | 996<br>995   | 906         | 816           | 731<br>730          | 6        |
| 44       | 1901                           | 1790         | 1682         | 1577         | 1474                  | 1373                  | 1275          | 1179         | 1085         | 903          | 903         | 815           | 729                 | 6        |
| 45       | 1899                           | 1788         | 1680         | 1575         | 1472                  | 1372                  | 1274          | 1178         | 1084         | 992          | 903         | 814           | 727                 | 6        |
| 46       | 1897                           | 1786         | 1678         | 1573         | 1470                  | 1370                  | 1272          | 1176         | 1082         | 990          | 900         | 812           | 726                 | 6        |
| 47       | 1895                           | 1785         | 1677         | 1571         | 1469                  | 1368                  | 1270          | 1174         | 1081         | 989          | 899         | 811           | 724                 | 6        |
| 48       | 1893                           | 1783         | 1675         | 1570         | 1467                  | 1367                  | 1269          | 1173         | 1079         | 987          | 897         | .8C9          | 723                 | 6        |
| 49       | 1891                           | 1781         | 1673         | 1568         | 1463                  | 1365                  | 1267          | 1171         | 1078         | 986          | 826         | 808           | 721                 | 6        |
| 50       | 1889                           | 1779         | 1671         | 1566         | 1464                  | 1363                  | 1266          | 1170         | 1076         | 954          | 894         | 806           | 720                 | 6        |
| 51       | 1888                           | 1777         | 1670         | 1565         | 1462                  | 1362                  | 1264          | 1168         | 1074         | 983          | 893         | 80.5          | 719                 | 6        |
| 52       | 1886                           | 1775         | 1668         | 1563         | 1460                  | 1360                  | 1262          | 1167         | 1073         | 981          | 891         | 803           | 717                 | 6        |
| 53<br>54 | 1884<br>1882                   | 1774<br>1772 | 1666<br>1664 | 1561<br>1559 | 1459<br>1457          | 1359<br>1357          | 1261<br>1259  | 1165<br>1163 | 1071         | 980<br>978   | 890<br>888  | 802<br>801    | 716<br>714          | 6        |
| 55       | 1880                           | 1770         | 1663         | 1538         | 1455                  | 1355                  | 1257          | 1162         | 1068         | 977          | 887         | 799           | 713                 | 6        |
| 56       | 1878                           | 1768         | 1661         | 1556         | 1454                  | 1354                  | 1256          | 1160         | 1067         | 975          | 885         | 798           | 711                 | 6        |
| 57       | 1876                           | 1766         | 1659         | 1554         | 1452                  | 1352                  | 1254          | 1159         | 1065         | 974          | 884         | 796           | 710                 | 6        |
| 58       | 1875                           | 1765         | 1657         | 1552         | 1450                  | 1350                  | 1253          | 1157         | 1064         | 972          | 883         | 795           | 709                 | 6        |
| 59       | 1873                           | 1763         | 1655         | 1551         | 1449                  | 1349                  | 1251          | 1156         | 1062         | 971          | 881         | 793           | 707                 | 6        |
| Sec.     | 2280                           | 2340         | 2400         | 2460         | 2520                  | 2,580                 | 2640          | 2700         | 2760         | 2820         | 2880        | 2940          | 3000                | 3        |
|          |                                |              |              |              |                       | Se                    | conds.        | <del></del>  |              |              | <del></del> | - <del></del> |                     |          |

TABLE XC. LOGISTIC LOGARITHMS.

| -            | Minutes.   |             |             |            |              |            |            |                              |                      |                              |                          |                       |              |
|--------------|------------|-------------|-------------|------------|--------------|------------|------------|------------------------------|----------------------|------------------------------|--------------------------|-----------------------|--------------|
| 52           | 53         | 54          | 55          | 56         | 57           | 58         | 59         | 60                           | 61                   | 62                           | 63                       | 64                    | 65           |
| 621          | 539        | 458         | 378         | 300        | 223          | 148        | 073        | 000                          |                      | 9858,                        | 9788                     | 9720                  |              |
| 620          | 537        | 456         | 377         | 298        | 221          | 146        | 073        | 9999                         | 9928<br>9927         | 9856                         | 9787                     | 9720                  | 9652<br>9651 |
| 619          | ·536       | 455         | 375         | 297        | 220          | 143        | 071        | 9993                         | 9926                 | 9355                         | 9786                     | 9717                  | 9650         |
| 617          | 535        | 454         | 374         | 296        | 219          | 143        | 069        | 9996                         | 9925                 | 9854                         | 9785                     | 9716                  | 9649         |
| 616<br>615   | 538        | 452<br>451  | 373         | 294        | 218<br>216   | 142        | 068        | 9995                         | 9923                 | 9853                         | 9784                     | 9715                  | 9648         |
| 613          | 532<br>531 | 451<br>450  | 371<br>370  | 298        | 215          | 141        | 067<br>066 | 9994                         | 9922                 | 9852                         | 9782                     | 9714                  | 9647         |
| 612          | 529        | 448         |             | 291        | 211          | 139        | 064        | 9992                         | 9921<br>9920         | 9851<br>. <b>984</b> 9       | 9781.<br>9780            | 9713<br>9712          | 9646<br>9645 |
| 610          | 528        | 447         | 367         | 289        | 213          | 137        | 063        | 9990                         | 9919                 | 9848                         | 9779                     | 9711                  | 9643         |
| 609          | 526        | 446         | 366         | 288        | 211          | 136        | 062        | 9989                         | 9918                 | 9847                         | 9778                     | 9710                  | 9642         |
| 608          | 525        | 444         | 365         | 287        | 210          | 135        | 061        | 9988                         | 9916                 | 9846                         | 9777                     | 9708                  |              |
| <b>6</b> 06  | 524        | 443         | 363         | 285        | 309          | 134        | 060        | 9987                         | 9915                 | 9845                         | 9775                     | 9707                  | 9641<br>9640 |
| 605          | 522        | 442         | 362         | 284        | 208          | 132        | 058        | 9986                         | 9914                 | 9844                         | 9774                     | 9706                  | 9639         |
| 603          | 521        | -440        | 361         | 283        | 206          | 131        | 057        | 9984                         | 9913                 | 9842                         | .9773                    | 9705                  | 9638         |
| 602<br>601   | 520<br>518 | 439         | 359         | 282        | 205          | 130        | 056        | 9983                         | 9912                 | 9841                         | 9772                     | 9704                  | 9637         |
| 599          | 517        | 438.<br>436 | 358<br>357  | 280<br>279 | 204<br>202   | 129<br>127 | 055<br>053 | 9982                         | 9910                 | 9840                         | 9771                     | 9703                  | 9636         |
| 598          | 516        | 435         | 356         | 278        | 201          | 126        | 052        | 9981<br>9980                 | 9909<br>9908         | 9839<br>9838                 | 9770.<br>9769            | 970 <b>2</b><br>9701  | 9635<br>9633 |
| <b>5</b> 96  | 514        | 434         | 354         | 276        | 200          | 125        | 051        | 9978                         | 9907                 | 9837                         | 9767                     | 9699                  | 9632         |
| <b>5</b> 95  | 513        | 432         | 353         | 275        | 199          | 124        | 050        | 9977                         | 9906                 | 9835                         | 9766                     | 9698                  | 9631         |
| 594          | 512        | 431         | 352         | 274        | 197          | 122        | 049        | 9976                         | 9905                 | 9834                         |                          |                       |              |
| 592          | 510        | 430         | 350         | 273        | 196          | 121        | 049        | 9975                         | 9903                 | 9834                         | 9765<br>976 <del>4</del> | 9697<br>9 <b>69</b> 6 | 9630<br>9629 |
| 591          | 509        | 428         | 349         | 271        | 195          | 120        | 046        | 9974                         | 9902                 | 9832                         | 9763                     | 9695                  | 9628         |
| 590          | 507        | 427         | 348         | 270        | 194          | 119        | 045        | 9972                         | 9901                 | 9831                         | 9762                     | 9694                  | 9627         |
| <b>58</b> 8  | 506        | 426         | 346         | 269        | 192          | 117        | 044        | 9971                         | 9900                 | 9830                         | 9761                     | 9693                  | 9626         |
| 587<br>585   | 505<br>503 | 424<br>423  | 345<br>344  | 267        | 191          | 116        | 012        | 9970                         | 9899                 | 9829                         | 9759                     | 9692                  | 9625         |
| <i>5</i> 84  | 503        | 423         | 342         | 266<br>265 | 190<br>189   | 115<br>114 | 041        | 9969                         | 9897                 | 9827                         | 9758                     | 9690                  | 9624         |
| 583          | 501        | 420         | 341         | 264        | 187          | 112        | 039        | 9968<br>9966                 | 9896<br>9895         | 9826<br>9825                 | 9757<br>9756             | 9689<br>9688          | 9622<br>9621 |
| <i>5</i> 81  | 499        | 419         | 340         | 262        | 186          | 111        | 038        | 9965                         | 9894                 | 9824                         | 9755                     | 9687                  | 9620         |
| 580          | 498        | 418         | 339         | 261        | 185          | 110        | 036        | 9964                         | 9893                 | 9823                         | 9754                     | 9686                  | 9619         |
| 579          | 497        | 416         | 337         | 260        | 184          | 109        | 035        | 9963                         | 9892                 | 9822                         | 9753                     | 9685                  | 9618         |
| 577          | 495        | 415         | 336         | 258        | 182          | 107.       | 084        | 9962                         | 9890                 | 9820                         | 9751                     | 9684                  | 9617         |
| 576          | 494        | 414         | 335         | 257        | 181          | 106.       | 033        | 9960                         | 9889                 | 9819                         | 9750                     | 9683                  | 9616         |
| 574<br>573   | 493<br>491 | 412<br>411  | 333<br>332  | 256<br>255 | 180          | 105        | 031        | 9959                         | 9888                 | 9818                         | 9749                     | 9681                  | 9615         |
| 572          | 490        | 410         | 381         | 253        | 179<br>177   | 104        | 030<br>029 | 9958                         | 9887                 | 9817                         | 9748                     | 9680                  | 9614         |
| 570          | 489        | ·408        | 329         | 252        | 176          | 103        | 029        | 9957<br>9 <b>956</b>         | 9886<br>988 <b>5</b> | 9816<br>9815                 | 9747<br>9746             | 9679<br>9678          | 9612<br>9611 |
| 569          | 487        | 407         | 328         | 251        | 175          | 100        | 027        | 9954                         | 9883                 | 9813                         | 9745                     | 9677                  | 9610         |
| 568          | 486        | 406         | 327         | 250        | 174          | 099        | 025        | 9953                         | 9882                 | 9812                         | 9744                     | 9676                  | 9609         |
| 566          | 484        | 404         | 326         | 248        | 172          | 098        | 024        | 9952                         | 9881                 | 9811                         | 9742                     | 9675                  |              |
| 565          | 483        | 403         | 324         | 247        | 171          | 096        | 023        | 9951                         | 9880                 | 9810                         | 9742                     | 9674                  | 9608<br>9607 |
| 563          | 482        | 402         | 323         | 246        | 170          | 095        | 022        | 9950                         | 9879                 | 9809                         | 9740                     | 9672                  | 9606         |
| 562          | 480        | 400         | 322         | 244        | 169          | 094        | .021       | 9948                         | 9877                 | 9808                         | 9789                     | 9671                  | 9605         |
| 561<br>559   | 479<br>478 | 399<br>398  | 320         | 243        | 167          | 093        | 019        | 9947                         | 9876                 | 9807                         | 9738                     | 9670                  | 9604         |
| 5 <b>3</b> 8 | 476        | 398         | 319<br>318. | 242<br>241 | 163<br>- 165 | 091        | 018        | 9946                         | 9875                 | 9805                         | 9797                     | 9669                  | 9603         |
| 557          | 475        | 395         | 316         | 239        | 163          | 089        | 017<br>016 | 99 <b>45</b><br>9 <b>944</b> | 9874<br>9879         | 980 <b>4</b><br>980 <b>3</b> | 9736<br>9734             | 9668                  | 9601         |
| <b>5</b> 55  | 474        | 394         | 315         | 238        | 162          | 088        | 015        | 9942                         | 9872                 | 9802                         | 9733                     | 9667<br>9666          | 9600<br>9599 |
| 554          | . A72      | 892         | 314         | 237        | 161          | 087        | 013        | 9941                         | 9870                 | 9801                         | 9732                     | 9665                  | 9598         |
| 552          | 471        | 391         | 313         | 235        | 160          | 085        | 012        | 9940                         | 9869                 | 9800                         | 9731                     | 9664                  | 9597         |
| 551          | 470        | 390         | 311         | 234        | 158          | 084        | 011        | 9939                         | 9868                 | 9798                         | 9730                     | 9662                  | 9596         |
| <i>55</i> 0  | 468        | 388         | 310         | 233        | 157          | 088        | 010        | 9938                         | 9867                 | 9797                         | 9729                     | 9661                  | 9595         |
| 548<br>547   | 467        | 387         | 309         | 232        | 156          | 082        | 008        | 9937                         | 9866                 | 9796                         | 9728                     | 9660                  | 9594         |
| 547<br>546   | 466<br>464 | 386<br>384  | 307         | 230        | 155          | 080        | 007        | 9935                         | 9865                 | 9795                         | 9727                     | 9659                  | 9593         |
| 544          | 463        | 383         | 306<br>305  | 229<br>228 | 153<br>152   | 079<br>078 | 006        | 9934                         | 9863                 | 9794                         | 9725                     | 9658                  | 9592         |
| 543          | 462        | 882         | 304         | 227        | 151          | 076        | 005        | 9933<br>9932                 | 9862<br>9861         | 9793<br>9792                 | 9724<br>9723             | 9657<br>9656          | 9590         |
| 541          | 460        | 381-        | 302         | 225        | 150          | 075        | 002        | 9931                         | 9860                 | 9792                         | 9722                     | 9655                  | 9589<br>9588 |
| 540          | 459        | 379         | 301         | 224        | 148          | 074        | 001        | 9929                         | 9859                 | 9789                         | 9721                     | 9653                  | 9587         |
| 3120         | 3180       | 3240        | 3300        | 3360       | 3420         | 3480       | 3540       | 3600                         |                      | 3720                         | 3780                     | 3840                  |              |
|              |            |             |             |            |              |            | nds.       | 0.700                        | 3000                 | 3120                         | 3100                     | J040                  | 8900         |
|              |            |             |             |            |              | Dece       | ,,,us.     |                              |                      |                              |                          |                       |              |

## TABLE XC. LOGISTIC LOGARITHMS.

| <del></del> | Minutes.     |              |                                  |              |              |              |                                |               |              |                              |                      |                              |                                |            |
|-------------|--------------|--------------|----------------------------------|--------------|--------------|--------------|--------------------------------|---------------|--------------|------------------------------|----------------------|------------------------------|--------------------------------|------------|
| Sec.        | 66           | 67           | 68                               | 69           | 70           | 71           | 72                             | 73            | 74           | 75                           | 76                   | 77                           | 78                             | 79         |
| 0           | 9586         | 9521         | 9456                             | 9393         | 9331         | 9269         | 9203                           | 9148          | 9089         | 9031                         | 8973                 | 8917                         | 8861                           | 880        |
| 1           | 9585         | 9520         | 9455                             |              | 9329         | 9268         |                                | 9147          | 9088         | 9030                         |                      | 8916                         | 8860                           | 880        |
| .2          | 9584         | 9519         | 9454                             |              | 9328         | 9267         |                                | 9146          | 9087         | 9029                         |                      | 8915                         | 8859                           | 880        |
| 3           | 9583         | 9518         | 9453                             | 9390         | 9327         |              | 9205                           | 9145          | 9086         |                              | 8971                 | 8914                         | 8858                           | 880        |
| 4<br>5      | 9582<br>9581 | 9516         | 9452<br>9451                     | 9389<br>9388 | 9326<br>9325 |              | 9204<br>9203                   | 9144<br>9143  | 9085         | 9027<br>9026                 |                      | 8913<br>8912                 | 88 <i>5</i> 7<br>88 <i>5</i> 6 | 880<br>880 |
| 6           | 9579         | 9514         | 9450                             | t .          | 9324         | 1 - 1        | 9202                           | 9142          | 9083         |                              | 8968                 | 8911                         | 8855                           | 880        |
| 7           | 9578         | 9513         | 9449                             |              | 9823         |              | 9201                           | 9141          | 9082         |                              | 8967                 | 8910                         | 8854                           | 879        |
| 8           | 9577         | 9512         |                                  | 9385         | 9322         |              | 9200                           | 9140          | 9081         |                              | 8966                 | 8909                         | 8853                           | 879        |
| . 9         | 9576         | 9511         | 9447                             | 9384         | 9321         | 9260         | 9199                           | 9139          | 9080         | 9022                         | 8965                 | 8908                         | 8852                           | 879        |
| 10          | 9575         | 9510         |                                  | 9383         | 9320         | 9259         |                                |               | 9079         |                              | 8964                 | 8907                         | 8851                           | 879        |
| 11          | 9574         | 9509         |                                  | 9381         | 9319         | 9258         | 9197                           | 9137          | 9078         |                              | 8963                 | 8906                         | 8850                           | 879        |
| 12          | 9573         | 9508         |                                  | 9380         | 9318         | 9257         | 9196<br>9195                   | 9136          | 9077         |                              | 8962                 | 8905                         | 8919                           | 879<br>879 |
| 13<br>14    | 9572<br>9571 | 9507<br>9506 |                                  | 9379<br>9378 | 9317<br>9316 | 9256<br>9255 | 9193                           | 9135<br>9134  | 9076         |                              | 8961<br>8960         | 890 <b>4</b><br>890 <b>3</b> | 8849<br>8849                   | 879        |
| 15          | 9570         | 9505         |                                  | 9377         | 9315         | 9254         | 9193                           | 9133          | 9075         |                              | 8959                 | 890 <b>3</b>                 | 8847                           | 879        |
| 16          | 9569         | 9504         |                                  | 9376         | 9314         | 9253         | 9192                           | 9132          | 9074         | 9015                         |                      | 8902                         | 8846                           | 879        |
| 17          | 9567         | 9502         |                                  | 9375         | 9313         | 9252         | '                              | 9131          | 9073         |                              | 8957                 | 8901                         | 8845                           | 879        |
| 18          | 9566         | 9501         |                                  | 9374         | 9312         | 9251         | 9190                           | 9130          | 9072         | 9014                         | 8956                 | 8900                         | 8844                           | 878        |
| 19          | 9565         | 9500         | 9436                             | 9373         | 9311         | 9250         | 9189                           | 9129          | 9071         | 9013                         | 8955                 | 8899                         | 8843                           | 878        |
| 20          | 9564         | 9499         |                                  | 9372         | 9310         | 9249         | 9188                           | 9128          | 9070         | 9012                         |                      | 8898                         | 8842                           | 878        |
| 21          | 9568         | 9498         |                                  | 9371         | 9309         | 9348         | 9187                           | 9128          | 9069         |                              | 8953                 | 8897                         | 8841                           | 878        |
| 22          | 9562         | 9497         |                                  | 9370         | 9303         | 9247         | 9186                           | 9127          | 9068<br>9037 |                              | 8952                 | 8896                         | 8840                           | 878<br>878 |
| 23          | 9561<br>9560 | 9496<br>9495 |                                  | 9369<br>9368 | 9307<br>9396 | 9246<br>9245 | 9185<br>9184                   | 9126.<br>9125 | 9037         | 9009                         | 8952<br>8951         | 889 <i>ธ์</i><br>8894        | 8839<br>8838                   | 878        |
| 25          | 9559         | 9494         |                                  | 9367         | 9305         | 9243         | 9183                           | 9123          | 9065         | 9007                         | 8950                 | 8893                         | 8837                           | 878        |
| 26          | 9558         | 9493         | 9429                             | 9366         | 9304         | 9248         | 9182                           | 9123          | 9064         | 9006                         | 8949                 | 8892                         | 8837                           | 878        |
| 27.         | 9557         | 9492         | 9428                             | 9365         | 9303         | 9241         | 9181                           | 9122          | 9063         | 9005                         | 8948                 | 8891                         | 8886                           | 878        |
| 28          | 9555         | 9491         | 9427                             | 9364         | 9302         | 9240         | 9180                           | 9121          | 9062         | 9:04                         | 8947                 | 8890                         | 8835                           | 878        |
| 29          | 9554         | 9490         | 9426                             | 9363         | 9301         | 9239         | 9179                           | 9120          | 9051         | 9003                         | 8946                 | 8889                         | 8834                           | 877        |
| 30          | 9553         | 9489         | 9425                             | 9362         | 9300         | 9238         | 9178                           | 9119          | 9260         | 9002                         | 8945                 | 8888                         | 8833                           | 877        |
| 31          | 9552         | 9487         | 9424                             | 9361         | 9299         | 9237         | 9177                           | 9118          | 9059         | 9001                         | 8944                 | 8888                         | 8832                           | 877        |
| 32          | 9551         | 9486         | 9422                             | 9360         | 9298         | 9236         | 9176                           | 9117          | 9058         | 9000                         | 8943                 | 8887                         | 8831                           | 877<br>877 |
| 33<br>34    | 9550<br>9549 | 9485<br>9484 | 9421<br>9420                     | 9359<br>9358 | 9297<br>9296 | 9235<br>9234 | 9175<br>9174                   | 9116<br>9115  | 9057<br>9056 | 8999<br>8998                 | 8942<br>8941         | 8886<br>8885                 | 8830<br>8829                   | 877        |
| 35          | 9548         | 9483         | 9419                             | 9356         | 9294         | 9233         | 9173                           | 9114          | 9055         | 8997                         | 8940                 | 8884                         |                                | 877:       |
| 36          | 9547         | 9482         | 9418                             | 9355         | 9293         | 9232         | 9172                           | 9113          | 9054         | 8996                         | 89.39                | 8883                         | 8827                           | 877        |
| 37          | 9546         | 9481         | 9417                             | 9354         | 9292         | 9231         | 9171                           | 9112          | 9053         | 8995                         | 8938                 | 8882                         | 8826                           | 877        |
| 58          | 9545         | 9480         | 9416                             | <b>935</b> 8 | 9291         | 9230         | 9170                           | 9111          | 9052         | 8994                         | 8937                 | 8881                         | 8825                           | 877        |
| 39          | 9544         | 9479         | 9415                             | 9352         | 9290         | 9229         | 9169                           | 9110          | 9051         | 8993                         | 8936                 | 8880                         | 8825                           | 877        |
| 40          | 9542         | 9478         | 9414                             | 9351         | 9289         | 9228         | 9168                           | 9109          | 9050         | 8992                         | 8935                 | 8879                         |                                | 876        |
| 41          | 9541<br>9540 | 9477<br>9476 | 9413<br>9412                     | 9350<br>9349 | 9288<br>9287 | 9227<br>9226 | 9167<br>9166                   | 9108          | 9049<br>9048 | 8992<br>8991                 | 8935<br>89 <b>34</b> | 8878<br>8877                 | 8823<br>8822                   | 876<br>876 |
| 45          | 9539         | 9475         | 9411                             | 9348         | 9286         | 9225         | 9165                           | 9106          | 9047         | 8990                         | 8933                 | 8876                         | 8821                           | 876        |
| 44          | 9538         | 9473         | 9410                             | 9547         | 9285         | 9224         | 9164                           | 9105          | 9046         | 8989                         | 8932                 | 8875                         | 8820                           | 876        |
| 45          | 9537         | 9472         | 9409                             | 9346         | 9284         | 9223         | 9163                           | 9104          | 9045         | 8988                         | 8931                 | 8875                         | 8819                           |            |
| 46          | 9536         | 9471         | 9408                             | 9345         | 9283         | 9222         | 9162                           | 9103          | 9044         | 8987                         | 8930                 | 8874                         | 8818                           | 876        |
| 47          | 9535         | 9470         | 9407                             | 9344         | 9282         | 9221         | 9161                           | 9102          | 9043         | 8986                         | 8929                 | 8873                         | 8817                           | 876        |
| 48          | 9534<br>9533 | 9469<br>9468 | 9406<br>9405                     | 9843<br>9342 | 9281<br>9280 | 9220<br>9219 | 9160<br>9159                   | 1019          | 9042<br>9042 | 898 <i>5</i><br>898 <b>4</b> | 8928                 | 8872<br>8871                 | 8816<br>881 <i>5</i>           | 876<br>876 |
| i'          |              |              |                                  |              |              |              |                                |               |              |                              | 8927                 |                              |                                |            |
| 50<br>51    | 9532<br>9530 | 9467<br>9466 | 9404<br>9402                     | 9341<br>9340 | 9279<br>9278 | 9218<br>9217 | 91 <i>5</i> 8<br>91 <i>5</i> 7 | 9099<br>9098  | 9041<br>9040 | 8983<br>8982                 | 8926<br>8925         | 8870<br>8869                 | 8814<br>8813                   | 0==        |
| 52          | 9529         | 9465         |                                  | 9339         | 9277         |              | 9156                           | 9097          | 9059         |                              | 8924                 | 8868                         | 8813                           | 875        |
| 53          | 9528         | 9464         |                                  | 9338         | 9276         |              | 9155                           | 9096          | 9038         |                              | 8923                 | 8867                         |                                | 875        |
| 54          | 9527         | 9463         | 9399                             |              | 9275         |              | 9154                           | 9095          | 9037         |                              | 8922                 | 8866                         | 8811                           | 875        |
| 55          | 9526         | 9462         |                                  | 9386         | 9274         |              | 9153                           | 9094          | 9036         |                              | 8921                 | 8865                         | 8810                           |            |
| 56          | 9525         | 9461         | 9397                             |              | 9273         |              | 9152                           | 9093          | 9035         |                              | 8920_                |                              | 8809                           |            |
| 57          | 9524         | 9460         |                                  | 9334         | 9272         |              | 9151                           | 9092          | 9094         | . :                          | 8919                 | 8863                         | 8808                           |            |
| 58<br>59    | 9523<br>9522 | 9459         | 939 <i>5</i><br>939 <del>4</del> | 9333<br>9332 | 9271<br>9270 |              | 91 <i>5</i> 0<br>9149          | 9091<br>9090  | 9033<br>9032 |                              | 8918<br>8 <b>918</b> | 8862<br>8861                 | 8807<br>8806                   |            |
| Sec         | 3960         | 4020         | 4080                             | 4140         | 4200         | 4260         | 4320                           | 4380          | 4440         | l                            | 4560                 | 4620                         |                                | 474        |
| منتانه      | JJUV         | 1020         | 1000                             | 4140         | 7200         | <u> </u>     | Second                         |               | 7740         | 4500                         | 1000                 | 1020                         | - 1                            |            |
|             |              |              |                                  | •            |              |              | ~crione                        | 440           |              | •                            |                      |                              | <u> </u>                       |            |

TABLE XCI.
FOR THE CONSTRUCTION OF WATER MILLS.

| endic.        | Valocity | of the  | Revolution | ons of the |        | No. of revol |                   |  |
|---------------|----------|---------|------------|------------|--------|--------------|-------------------|--|
| ht of         | Water    | W'heci  | Wheel      | Millstone, | Cogs   | Staves       | of the millstone, |  |
| all of        | per      | per     | per        | for one of | in the |              | per min. by these |  |
| ter.          | Second.  | Second. | Minute.    | the Wheel. | Wheel. | Trundle.     | Cogs and Staves.  |  |
| et.           | Feet.    | Feet.   | Revolut.   | Revolut.   | Cogs.  | Staves.      | Revolutions.      |  |
| 1             | 8.02     | 2.67    | 2.83       | 21.20      | 127    | 1 .6         | 59.92             |  |
| 2             | 11.34    | 3.78    | 4.00       | 15.00      | 105    | 7            | 60.00             |  |
| 2             | 13.89    | 4.63    | 4.91       | 12.23      | 98     | 8            | 60,14             |  |
| 4             | 16.04    | 5.35    | 5.67       | 10.58      | 9.5    | 9            | 59.87             |  |
| 4<br>5<br>6   | 17.93    | 5.98    | 6.34       | 9.46       | 85     |              | 59.8 <b>4</b>     |  |
| 6             | 19.64    | 6.55    | 6.94       | 8.64       | 78     | 9′           | 60.10             |  |
| 7             | 21.21    | 7.07    | 7.50       | 8.00       | 72     | 9            | 60.00             |  |
| <b>8</b><br>9 | 22.68    | 7.56    | 8.02       | 7.48       | 67     | 9            | 59.67             |  |
| 9             | 24.05    | 8.02    | 8.51       | 7.05       | 70     | 10           | 59.57             |  |
| :ó            | 25.35    | 8.45    | 8.97       | 6.69       | 67     | 10           | 60.09             |  |
| 11            | 26.59    | 8.86    | 9.40       | 6.38       | 64     | 10           | 60.16             |  |
| 12            | 27.77    | 9.26    | 9.82       | 6.11.      | 61     | 10           | 59.90             |  |
| 13            | 28.91    | 9,64    | 10.22      | 5.87       | 59     | 10           | 60.18             |  |
| 14            | 30.00    | 10.00   | 10.60      | 5 66       | 56     | 10           | 59.36             |  |
| 15            | \$1.05   | 10.35   | 10.99      | 5.46       | 55     | 10           | 60.48             |  |
| 16            | 32.07    | 10.69   | 11.34      | 5.29       | 53     | 10           | 60.10             |  |
| 17            | 93.06    | 11.02   | 11.70      | 5.13       | 51     | 10           | 59.67             |  |
| 18            | 84.02    | 11.54   | 12.02      | 4.99       | 50     | 10           | 60.10             |  |
| 19            | 34.95    | 11.65   | 12.37      | 4.85       | - 49   | 10           | 60.61             |  |
| 20            | 35.86    | 11.95   | 12.68      | 4.73       | 47     | 10           | 59.59             |  |

## TABLE XCII.

## QUANTITY OF WATER DISCHARGED IN ONE MINUTE, BY PUMPS OF DIFFERENT DIMENSIONS.

| ight of<br>ip above<br>of water. | Diameter of<br>bore, where<br>bucket works. | ter disch | arged, |       | bore, where | Quantity of water discharged, in wine measure. |            |  |
|----------------------------------|---|-----------|--------|-------|-------------|--|------------|--|
| Feet.                            | Inches.                                     | Gallons   | Pints  | Feet. | Inches.     | Gallons.                                       | Pints.     |  |
| 10                               | 6.93  | 81        | 6      | 60    | 2.84        | 13   | 5          |  |
| 15                               | 5.65  | 54        | 4      | 65    | 2.72        | 12   | 4 .        |  |
| 20                               | 4.90  | 40        | 7      | 70    | 2.62        | 11   | · <b>5</b> |  |
| 25                               | 4.38  | 32        | 6      | 75    | 2.53        | 10   | 7          |  |
| 30                               | 4.00  | 27        | 2      | 80    | 2.45        | 10   | 2          |  |
| <b>95</b>                        | 3.70  | 23        | 3      | 85    | 2.38        | 9  | 5          |  |
| 40                               | 3.46  | 20        | 3      | 90    | 2.31        | . 9  | 1          |  |
| 45                               | 8.27  | 18        | 1      | 95    | 2.25        | 8  | 5          |  |
| <i>5</i> 0                       | 8.10  | 16        | 8      | 100   | 2.19        | 8  | 1          |  |
| <b>5</b> 5                       | 2,95  | 14        | 7      | U.    | <b>{</b>    | l  |            |  |

## TABLE XCIII.

## NGTH OF A PENDULUM, VIBRATING SECONDS, IN DIFFERENT LATITUDES; WITH THE MEASURE OF A DEGREE OF LATITUDE IN ENGLISH MILES.

| ttitude.  | Length of Pend | Length of Deg. | Latitude. | Length of Pend. | Length of Deg. |
|-----------|----------------|----------------|-----------|-----------------|----------------|
| egrees.   | Inches         | English Miles. | Degrees.  | Inches.         | English Miles. |
| 0         | 89.027         | 68.723         | 50        | 39.126          | 69.256         |
| 5         | S ) 029        | 68.730         | 55        | 39.142          | 69.330         |
| 10        | 39.032         | 68.750         | 60        | 39.1 <i>5</i> 8 | 69.401         |
| 15        | 39.036         | 68.783         | 65        | 39.168          | 69.467         |
| 20        | <b>39.044</b>  | 68.830         | 70        | 39.177          | 69.522         |
| 25        | 39.057         | 68.882         | 75        | 39.185          | 69.568         |
| 30        | 39.070         | 68.950         | 80        | 39.191          | 69.601         |
| 25        | 39.084         | 69.020         | 85        | 39, 195         | 69.620         |
| 40.       | 89.097         | 69.097         | 90        | 39.197          | 69.628         |
| <b>45</b> | 39.111         | 69.176         |           |                 |                |

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<sup>\*</sup> For the method of performing the several sailings, the journal, the latitude by double altitudes, variation of the compass, lunar observations, &c. by the Sliding Gunter, a reference has been made to the Treatise expressly on the use of that instrument, by the Author.

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The second Volume contains seventy Tables, with their Explanation prefixed; and an Appendix, containing two Tables; the Method of finding the Time of the rising and setting of the Sun, Moon, and fixed Stars; the Time of the Beginning, End, and Duration of Twilight, &c.

## The following are Extracts from some of the Reviews, relative to the First Edition of this Work.

"From the preceding abstract of the contents of this valuable work, our readers will be better able to judge what information they may degive from it, than they could have been by any detached extract which we might have selected. Of the Author's extensive and accurate acquaintance with the subject to which he has directed our attention, none who peruse what he has written can entertain any doubt. To the Navigator and Astronomer, and also to the practical Geographer and Surveyor, this work will be instructive and useful. We cannot conclude without expressing our wishes, that the author may be suitably encouraged in the prosecution of the plan which he has undertaken, of publishing a distinct Treatise on the Theory, and Practice of Navigation, and another in three volumes on the Theory and Practice of Astronomy." Monthly Review for March 1794.

"Throughout the articles which we have specified, Dr. Mackay's zeal and ability to instruct his readers are equally manifest. He has not only written fully on the subjects themselves, but has also introduced such collateral matter as was likely to satisfy the inquisitive reader, and illustrate his principal design. In his description of instruments, we meet with the minuteness of an artist; in his application of them, we find the attention of an accurate observer; and in the demonstration of his rules, we see the precision of a practised geometrician." British Critic for March 1794.

"A very useful praxis and investigation of the various modes of finding the Longitude. The author first gives a concise account of the planetary system; then describes the various instruments used in taking altitudes; and after a sufficient number of preparatory problems, the mode of finding the Longitude by lunar observations; eclipses of the Sun and Moon; occultations of fixed stars by the Moon; eclipses of the satellites of Jupiter; by the chronometer; and the variation charts. The praxis is in the former; the demonstrations in the latter part of the first volume: the second volume contains the necessary tables. After each rule is a sufficient number of examples, to give a perfect knowledge of the use of it. The Navigator who has mastered the problems in this work, will not, with a clear sky over his head, find himself at a loss for his reckoning; and it might be made a useful compendium in a long voyage; for, by daily perusal, the younger proficients in the art of Navigation may acquire a taste for a mode of observation, which we fear, notwithstanding its evident utility, has by no means obtained general practice. In speaking this of younger proficients, we do not mean to say, that any person, whether on land or at sea, who employs himself in finding the Longitude of the place he is in, will not reap much advantage by having the rules and examples laid down in this work to guide him in his practice; for no method will easily occur, of which he will not find here an example."—Critical Review for August 1794.

"The Theory and Practice of finding the Longitude, &c. is a work which will be found of considerable utility and importance to the Navigator and to the Astronomer, as the author appears to be accurately acquainted with the subject on which he treats, and is perspicuous and satisfactory in his methods of explanation." New Annual Register, for 1793.

See also L'Esprit pre Journeaux for April 1794, &c.